TESIS DOCTORAL

El Desarrollo de las Finanzas para la Sostenibilidad Corporativa: Bonos ESG

The Development of Finance for Corporate Sustainability: ESG Bonds

Presentada por:

Rubén Ordóñez Borrallo

Dirigida por:

Prof. Dra. Natalia Ortiz Martínez de Mandojana

Prof. Dr. Javier Delgado Ceballos

MENCIÓN DE DOCTOR INTERNACIONAL

UNIVERSIDAD DE GRANADA

PROGRAMA DE DOCTORADO EN CIENCIAS ECONÓMICAS Y EMPRESARIALES

ESCUELA DE DOCTORADO DE HUMANIDADES, CIENCIAS SOCIALES Y JURÍDICAS

Facultad de Ciencias Económicas y Empresariales

Granada 2025

Editor: Universidad de Granada. Tesis Doctorales
Autor: Rubén Ordóñez Borrallo
ISBN: 978-84-1195-996-4
URI: https://hdl.handle.net/10481/111913

Esta tesis doctoral ha sido posible gracias a la ayuda para la Formación del Profesorado Universitario (PFU19/01217) del Ministerio de Ciencia, Innovación y Universidades (MICIU) del Gobierno de España. También he de agradecer el apoyo de los proyectos de investigación correspondientes a la ayuda PID2019-107767GA-I00 financiado por MCIN/AEI/10.13039/501100011033, la subvención C-SEJ-069-UGR23, financiada por la Consejería de Universidad, Investigación e Innovación y por el Programa FEDER Andalucía 2021-2027, así como el PP2023.EI.02 financiado por el plan propio de investigación y transferencia de la Universidad de Granada. Del mismo modo, se ha contado con la financiación del grupo de investigación Innovación, Sostenibilidad y Desarrollo Empresarial (ISDE) y del Departamento de Organización de Empresas II de la Universidad de Granada.

AGRADECIMIENTOS

Esta tesis doctoral marca la culminación de un camino lleno de retos, aprendizajes y experiencias significativas. En él he encontrado la motivación, la fortaleza y la ilusión para crecer, tanto en lo profesional como en lo personal. Sin duda, ha sido un recorrido que no habría sido posible sin la presencia y el apoyo de diferentes personas que, de una manera u otra, han impulsado cada uno de mis pasos.

En primer lugar, expreso mi más sincero agradecimiento a mis directores de tesis, Natalia Ortiz y Javier Delgado, pilares fundamentales en este proceso. La confianza que habéis depositado en mí y vuestros sabios consejos han marcado la diferencia en cada etapa de este proceso. Natalia, resulta curioso cómo una conversación casual durante aquel blablacar marcó un antes y un después en mi trayectoria. Sin ese encuentro fortuito probablemente no estaría escribiendo estas líneas ni habría imaginado iniciar este viaje doctoral. Gracias infinitas por tu cercanía, tus sabios consejos y tu constante apoyo en cada etapa de la tesis. Tu capacidad para encontrar siempre la perspectiva adecuada, para aportar claridad donde había dudas y para motivarme con cada avance han sido un pilar fundamental en este camino. Javier, agradezco enormemente tu dedicación y paciencia con el que siempre has dirigido mis pasos, enseñándome el valor de la precisión y del esfuerzo continuo. Tu capacidad para guiarme con exigencia, pero también con comprensión, ha sido fundamental para mi desarrollo académico. Tu motivación y confianza en mis capacidades me impulsaron a seguir adelante.

Mi agradecimiento también a Ambra Galeazzo y a la Universidad de Padua, donde tuve la oportunidad de realizar una estancia de investigación. Ambra, tu acogida y apoyo han sido esenciales para mi formación, y he aprendido mucho gracias a ti. Gracias por hacer que me sintiera en casa en todo momento. Tu apoyo ha sido fundamental para avanzar en la fase final de esta tesis.

Asimismo, quiero expresar mi gratitud a todos los miembros del Departamento de Organización de Empresas II y del grupo ISDE. A Alberto Aragón, cuyas clases magistrales en el Máster de Economía y Organización de Empresas me dieron el último impulso que necesitaba cuando aún dudaba si embarcarme en este gran reto. A Lola Vidal, por su apoyo incondicional desde el primer día en que coincidimos; tu espíritu generoso me ha demostrado la importancia de la colaboración y el compañerismo. A Eulogio

Cordón, por su disponibilidad constante y por haber gestionado el departamento con excelencia, facilitando cada paso burocrático y estadístico. Y a Nuria Hurtado, directora del grupo ISDE, por su dedicación y su incansable empeño en impulsar la investigación de alta calidad.

Mencionar también a los compañeros jóvenes que, a la par que yo, han vivido la exigencia y la emoción de elaborar su tesis doctoral. Elena, María, Juan, Manuel, Alejandro y Sandra, gracias por vuestro compañerismo y por la ayuda aportada cuando la he necesitado.

Pero, mi agradecimiento más profundo va a mi familia. A mis padres, que siempre me han dado la libertad para elegir mi propio camino y me han ofrecido su apoyo incondicional. Su fe en mí es la base sobre la que se asienta cada uno de mis logros. A mi hermano Daniel, tan callado como comprensivo, que, aunque hable poco, siempre sé que comparte mi alegría cuando las cosas salen bien.

Cómo no agradecer también a Ana, mi compañera de vida. Tu apoyo incondicional y capacidad de alentarme en los momentos más difíciles han sido vitales. Sin ti, probablemente no habría llegado hasta aquí. También quiero extender mi agradecimiento a tus padres, cuyo cariño y hospitalidad siempre me han hecho sentir parte de la familia.

Finalmente, no puedo cerrar estas palabras sin mencionar con especial cariño a mis abuelas, Teresa y Aurora. Ellas estuvieron presentes en mis primeros pasos académicos, brindándome su apoyo económico y, aún más valioso, su apoyo emocional. Desde entonces, su recuerdo ha sido un refugio y una fuente de fuerza silenciosa que me ha acompañado hasta el final de este camino. Con inmenso cariño y gratitud, les dedico esta tesis doctoral.

¡Gracias a todos!

ÍNDICE DE CONTENIDOS

ÍNDICE DE TABLAS

ÍNDICE DE FIGURAS

CAPÍTULO 1:

INTRODUCCIÓN

1.1 Marco general e interés de la investigación

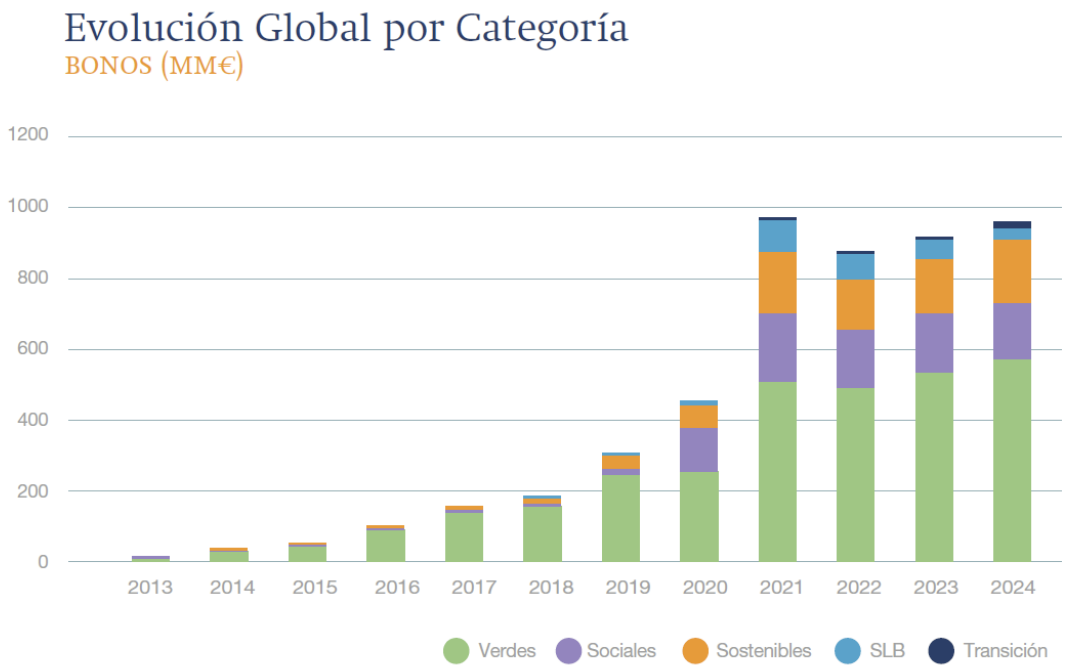
En las últimas décadas, la sostenibilidad corporativa se ha convertido en un eje central de las estrategias empresariales y en una prioridad para inversores, reguladores y consumidores. Para financiar este desarrollo sostenible han surgido las finanzas sostenibles. Tradicionalmente, las decisiones financieras se centraban en maximizar el beneficio económico; sin embargo, las finanzas sostenibles, a través de diversos instrumentos, emergen como un campo fundamental al integrar consideraciones medioambientales, sociales y de gobernanza (ESG, por sus siglas en inglés) en la toma de decisiones financieras (ICMA 2020c). Este enfoque busca canalizar capital hacia actividades económicas que fomenten el desarrollo sostenible, promoviendo inversiones responsables con impactos positivos tanto en medio ambiente como en la sociedad. De este modo, las empresas pueden no solo mejorar su desempeño operativo y financiero (Tsai & Liao, 2017; Yang et al., 2020), sino también contribuir activamente a un futuro más sostenible (Mathew & Sivaprasad, 2024). En este contexto, los instrumentos financieros sostenibles han cobrado gran relevancia, especialmente los bonos ESG, que permiten movilizar recursos hacia proyectos que fomentan una transición hacia la economía baja en carbono y la equidad social.

En particular, los bonos ESG (bonos verdes, bonos sociales, bonos sostenibles y bonos vinculados a la sostenibilidad) se han convertido en los instrumentos financieros más destacados para canalizar fondos hacia proyectos con beneficios medioambientales y sociales (ICMA, 2020a, 2021b). El auge de estos bonos se ha acompañado de una diversificación en sus formatos y objetivos, con distintas categorías según su finalidad específica. Los bonos verdes, que han sido los más predominantes, financian proyectos con impacto positivo en el medio ambiente, como energía renovable, eficiencia energética y gestión sostenible de los recursos naturales (Flammer, 2021). Por otro lado, los bonos sociales han cobrado relevancia al apoyar iniciativas que generan beneficios para comunidades vulnerables, como el acceso a la educación, la atención sanitaria y la inclusión financiera (Gonzalez-Ruiz, Marín-Rodríguez & Weber, 2024). En escenarios de postconflicto o de alta vulnerabilidad, tales mecanismos pueden implicar una contribución empresarial a la construcción de paz y el fortalecimiento institucional, en línea con el objetivo 16 de los objetivos y metas de desarrollo sostenible (Gallo et al., 2023). Asimismo, los bonos sostenibles combinan objetivos medioambientales y sociales,

financiando proyectos que abordan simultáneamente desafíos en ambas áreas (Mathew & Sivaprasad, 2024). Finalmente, los bonos vinculados a la sostenibilidad (SLBs) vinculan sus condiciones financieras a métricas de rendimiento ESG más amplias sin destinar fondos a proyectos específicos (Feldhütter et al., 2024). Estos bonos pueden ser emitidos tanto por entidades públicas como por empresas privadas, adaptando cada emisor sus estrategias y objetivos específicos; no obstante, la presente tesis doctoral se centra exclusivamente en las empresas privadas.

El creciente interés por estos instrumentos se ha reflejado en el notorio incremento de su volumen de emisión durante la última década. En efecto, la evolución de los bonos ESG en los últimos años ha sido notable, como se puede apreciar en el gráfico 1, estimulada tanto por la creciente demanda inversora como por la regulación que impulsa la sostenibilidad. Mientras que en 2013 las emisiones de bonos ESG se situaban en torno a 7 mil millones de euros (siendo el 90% emisiones de bonos verdes), en 2021 alcanzaron casi un millón de millones de euros, manteniéndose prácticamente constante hasta los 950 mil millones de euros en 2023 (Environmental Finance, 2025). Se prevé que esta tendencia continúe, consolidando a los bonos ESG como un componente clave dentro de las estrategias financieras corporativas. Además de la publicación de estándares regulatorios y la implementación de mecanismos de certificación para fomentar la transparencia, la creciente concienciación medioambiental, los compromisos gubernamentales y los incentivos regulatorios han acelerado la expansión de estos instrumentos. De este modo, los bonos ESG se han convertido en una alternativa cada vez más atractiva para financiar proyectos con beneficios medioambientales y sociales y para reforzar la confianza inversora, posicionándose como un pilar esencial de la financiación sostenible.

Figura 1.1. Evolución de los bonos ESG (2013-2024)



Fuente: Environmental Finance 2025.

En vista de este auge, diversos estudios han analizado los impactos de la emisión de bonos ESG tanto en las empresas como en la dinámica del mercado. De acuerdo con la literatura, la emisión de estos bonos puede impulsar mejoras medibles en el desempeño sostenible de las empresas. Por ejemplo, Flammer (2021) señala que las empresas que emiten bonos verdes suelen mejorar su calificación medioambiental y reducir sus emisiones de CO_2 en mayor medida que aquellas que no utilizan este mecanismo. Asimismo, Benlemlih et al. (2023) destacan un efecto positivo global en el perfil de sostenibilidad de las empresas emisoras, aunque este efecto no siempre se observa de forma uniforme (Fatica & Panzica, 2021). De forma específica, Fatica & Panzica (2021) revelan que la disminución de la intensidad de carbono depende de factores concretos, como la auditoría externa de los proyectos o la naturaleza de la emisión (financiación nueva vs. refinanciación). Sin embargo, la relevancia de la sostenibilidad corporativa no se limita a la adopción de prácticas "verdes"; también implica desarrollar competencias y conocimientos profundos que transformen la forma de entender el papel de la empresa y de sus gestores (Montiel, Gallo, & Antolín-López, 2019). En conjunto, la emisión de bonos ESG; sean verdes, sociales, sostenibles o ligados a la sostenibilidad, contribuye de manera significativa a la

adopción de prácticas más responsables y transparentes dentro de las organizaciones, generando importantes implicaciones en la relación con sus grupos de interés.

La emisión de bonos ESG funciona como un mecanismo de señalización frente a los grupos de interés. Al demostrar su compromiso con la sostenibilidad, las empresas emisoras pueden mejorar su reputación ante inversores, clientes, empleados y otros grupos de interés (Roberts & Dowling, 2002). Esto puede traducirse en mayor fidelidad de los consumidores, un atractivo adicional para el talento y un acceso más favorable a financiamiento. De acuerdo con la teoría de la señal (Spence, 1973; Connelly et al., 2011), las empresas emplean estrategias de comunicación para resaltar su compromiso con la sostenibilidad, sobre todo cuando existe asimetría de información con inversores y sociedad. En este sentido, los bonos ESG pueden fortalecer la reputación corporativa y fomentar la colaboración y la innovación entre distintos actores (Lian et al., 2024), al tiempo que la presión de inversores socialmente responsables motiva la emisión de estos instrumentos (Flammer et al., 2020). Asimismo, se ha planteado que las empresas optan por los bonos ESG no solo por beneficios monetarios, sino también para mejorar su imagen de marca y legitimidad en el mercado (Lau et al., 2022). Sin embargo, esta estrategia de señalización puede generar reacciones mixtas: un compromiso claro con objetivos medioambientales o sociales atrae a inversores interesados en la sostenibilidad y genera ventajas competitivas de largo plazo, mientras que el incumplimiento de las metas divulgadas puede acarrear costos reputacionales y deteriorar la credibilidad. Además de la reputación, las emisiones de bonos ESG pueden tener repercusiones en la valoración de las empresas emisoras.

En lo que respecta a la valoración bursátil, diversos estudios señalan que la emisión de bonos ESG puede repercutir positivamente en la valoración de las empresas, pues refuerza la confianza de los inversores en el compromiso sostenible de la organización (Flammer, 2021; Mathew & Sivaprasad, 2024). De hecho, el mercado tiende a reaccionar de manera favorable ante el anuncio de emisión de estos bonos, lo que se traduce en incrementos en el precio de las acciones a corto plazo (Arévalo et al., 2024). Desde la teoría de la señal, la emisión de un bono ESG transmite información sobre la solidez de la estrategia de sostenibilidad de la empresa y contribuye a reducir la asimetría informativa (Flammer, 2021). Además, la aparición de estos instrumentos suele atraer a inversores socialmente responsables, incrementando el interés por los valores de la

empresa y, con ello, su liquidez (Affolter et al., 2024). No obstante, este efecto depende de la capacidad de la empresa para cumplir con los objetivos vinculados al bono: un incumplimiento podría provocar pérdidas reputacionales e incluso sanciones financieras, afectando negativamente a la cotización de las acciones (Feldhütter et al., 2024). Dadas estas consideraciones, cobra relevancia analizar con mayor detalle el papel que juega la emisión de bonos ESG en diversos aspectos de la empresa emisora.

Por consiguiente, el interés de esta investigación radica en examinar las repercusiones que la emisión de bonos ESG tiene para las empresas emisoras. En particular, la presente tesis doctoral analiza el modo en que la emisión de bonos verdes afecta el desempeño medioambiental de las empresas (Capítulo 2), su reputación corporativa (Capítulo 3) y la reacción del mercado bursátil ante su emisión (Capítulo 4). A través de un análisis exhaustivo que recurre a múltiples enfoques teóricos y metodológicos, esta investigación busca aportar evidencia empírica sobre los efectos de los bonos ESG, contribuyendo así al debate académico y práctico en el ámbito de las finanzas sostenibles. Este análisis global permite una mejor comprensión de cómo las empresas pueden alinear sus estrategias financieras con los desafíos y requerimientos de la sostenibilidad.

De esta manera, la tesis doctoral se propone profundizar en el desarrollo de las finanzas para la sostenibilidad corporativa a través del estudio de los bonos ESG. Con un enfoque multidisciplinar y el análisis de datos empíricos, se pretende arrojar luz sobre el papel que desempeñan estos instrumentos en la promoción de un desempeño corporativo más sostenible y responsable, así como en la respuesta de las empresas ante los retos y demandas de su entorno. En última instancia, los hallazgos de la tesis ofrecen información valiosa que puede ser utilizada por empresas, inversores y reguladores para promover un futuro más sostenible y equitativo.

1.2 Objetivos de la investigación

La revisión de la literatura presentada en la sección anterior ha permitido establecer una definición de los bonos ESG, además de subrayar su creciente relevancia en el ámbito de las finanzas sostenibles. Sin embargo, aunque los bonos ESG han crecido significativamente en los últimos años y desempeñan un papel clave en el desarrollo sostenible, aún persisten desacuerdos en ciertos aspectos y carencias de análisis en otros. La literatura previa ha abordado cuestiones como la prima de mercado asociada a la

emisión de bonos verdes (Flammer, 2021; Larcker & Watts, 2020; Tang & Zhang, 2020; Zerbib, 2019), el efecto de la emisión de bonos verdes en el desempeño medioambiental de las empresas emisoras (Flammer, 2021; Benlemlih et al., 2023; Fatica & Panzica, 2021) y la reacción del mercado bursátil tras el anuncio de la emisión de bonos ESG (Mathew y Sivaprasad, 2024; Arévalo et al., 2024). Sin embargo, aún no existe consenso sobre el impacto real de estos bonos en la mejora del desempeño medioambiental, ni se conocen con precisión sus efectos bajo ciertas circunstancias. Asimismo, se observa la necesidad de estudios más pormenorizados que examinen su influencia en la reputación corporativa y en el mercado bursátil en la fecha efectiva de emisión.

Estas carencias detectadas en la literatura anterior constituyen la base para la formulación de los objetivos de la tesis doctoral. En este sentido, el objetivo general de esta investigación es analizar en profundidad cómo la emisión de bonos ESG influye en las empresas emisoras abordando tres dimensiones clave: el desempeño medioambiental de las empresas emisoras, su influencia en la reputación corporativa y la reacción del mercado bursátil tras su emisión. Para ello, se han aplicado distintos enfoques teóricos y metodológicos que permiten examinar estos efectos desde una perspectiva multidimensional, aportando así nueva evidencia empírica sobre la eficacia de estos instrumentos financieros en las empresas emisoras.

A fin de alcanzar este objetivo general, que constituye el eje central de la tesis, se plantean los siguientes objetivos específicos:

1. Evaluar el impacto de la emisión de bonos verdes en el desempeño medioambiental de las empresas emisoras.

   Aunque podría asumirse que dichos bonos inciden positivamente en este ámbito, investigaciones anteriores muestran que las mejoras no son uniformes en todas las empresas (Fatica & Panzica, 2021). Este objetivo a través del marco de la ABV, busca determinar si la emisión de estos bonos contribuye a mejorar la gestión medioambiental de las empresas emisoras al canalizar la atención desde la alta dirección al resto de miembros de la empresa hacia iniciativas sostenibles. Se examinará, asimismo, la influencia de la intensidad del bono verde en dicha relación y las condiciones internas que potencian o limitan estos efectos, considerando factores como el crecimiento, la rentabilidad y el endeudamiento.

2. Analizar el papel de los bonos ESG como señales de compromiso con la sostenibilidad y su impacto en las mejoras reputacionales.

   Aunque diversos estudios apuntan a un posible efecto de señalización (Tang y Zhang, 2020; Flammer, 2021; Mathew y Sivaprasad, 2024), el impacto de la emisión de estos bonos en los resultados reputacionales no se ha explorado en profundidad. Dado que la reputación es un activo intangible de gran valor para las empresas, su gestión mediante la emisión de bonos ESG constituye una estrategia financiera relevante. Este objetivo busca determinar si los bonos ESG pueden servir como una señal creíble del compromiso de la empresa con la sostenibilidad, mejorando su reputación y mitigando su riesgo reputacional. Basándose en la teoría de la señalización, se estudiará la percepción de diferentes grupos de interés, diferenciando entre accionistas y otras partes interesadas, y se evaluará en qué medida empresas con mejor desempeño en sostenibilidad y mayores costes de endeudamiento pueden fortalecer su reputación y reducir su riesgo reputacional.

3. Investigar la reacción del mercado bursátil ante la emisión de bonos ESG.

   Investigaciones previas han hallado una reacción positiva en el mercado ante el anuncio de la emisión de estos instrumentos, atribuible a efectos de señalización favorables (Flammer, 2021; Tang & Zhang, 2020; Mathew & Sivaprasad, 2024). No obstante, no se ha analizado en detalle el impacto en la fecha efectiva de emisión, momento en el que se dispone de información más completa acerca de las características del bono y su colocación en el mercado. Este objetivo se orienta a analizar cómo reaccionan los mercados de capitales ante la emisión de bonos ESG, a través de la variación del precio de las acciones de las empresas emisoras en torno a la fecha de emisión. Basándose en la EMH, se examinará de qué manera los inversores responden a la emisión de estos bonos y si la flexibilidad en el uso de los fondos influye en dicha reacción. Además, se explorarán posibles diferencias entre empresas financieras y no financieras.

En conjunto, estos objetivos ofrecen un enfoque exhaustivo para abordar la cuestión central de esta investigación, al combinar diversas perspectivas teóricas y metodológicas que permiten una visión holística del papel de los bonos ESG en las empresas emisoras.

1.3 Marco teórico y empírico y contribución de la investigación

Esta tesis doctoral se sustenta en tres marcos teóricos principales que, lejos de contradecirse, se complementan mutuamente. En primer lugar, se recurre a la teoría de la atención basada en la gestión (Attention-Based View, ABV) para determinar si la emisión de bonos ESG actúa como un mecanismo de focalización de la atención en cuestiones medioambientales a todos los niveles de la organización (Capítulo 2). En segundo lugar, se emplea la teoría de la señalización (Signaling Theory) para evaluar si la emisión de estos bonos funciona como una señal costosa y observable del compromiso de la empresa con la sostenibilidad, lo cual repercutiría en su reputación corporativa y en la mitigación del riesgo reputacional (Capítulo 3). Por último, se adopta la hipótesis del mercado eficiente (Efficient Market Hypothesis, EMH) para analizar la reacción del mercado bursátil en la fecha de emisión de los bonos ESG (Capítulo 4).

La ABV sostiene que la distribución de la atención dentro de la organización influye en la toma de decisiones y en los resultados empresariales (Ocasio, 1997; Ridge et al., 2017). En el marco de la tesis, se estudia cómo la emisión de bonos verdes puede canalizar la atención desde la alta dirección hasta los distintos niveles jerárquicos de la organización, lo que potencialmente se traduce en mejoras del desempeño medioambiental (Capítulo 2). Por su parte, la teoría de la señalización (Spence, 1973; Ross, 1977) señala que las señales creíbles reducen la incertidumbre y mitigan la asimetría de información (Bergh et al., 2014). Este enfoque es fundamental en el Capítulo 3, donde se analiza la relación entre la emisión de bonos ESG y la reputación corporativa, así como el riesgo reputacional. Se argumenta que las empresas pueden enviar señales creíbles de su compromiso con la sostenibilidad a través de estos instrumentos financieros, afectando tanto la percepción de los accionistas como la de otros grupos de interés. Finalmente, la EMH sugiere que los precios de mercado reflejan toda la información disponible; por ello, en el Capítulo 4 se examina la reacción del mercado bursátil en torno a la fecha de emisión de los bonos ESG.

Las investigaciones contenidas en la tesis también se sustentan en diversas técnicas estadísticas avanzadas, lo que permite un análisis riguroso y multidimensional del impacto de los bonos ESG en las empresas emisoras. La aplicación de metodologías cuantitativas diversas refuerza la solidez de los hallazgos y aporta una visión integral del

fenómeno estudiado. A lo largo de los distintos capítulos, se han empleado enfoques metodológicos complementarios que incluyen el uso de muestras emparejadas, modelos de regresiones con datos de papel y análisis de moderaciones, así como la metodología de estudio de eventos.

En el Capítulo 2 se analiza el efecto de la emisión de bonos verdes en el desempeño medioambiental de las empresas emisoras. Para ello, se ha empleado una estrategia basada en muestras emparejadas, la cual compara empresas emisoras de bonos verdes con otras de características similares (tamaño, rendimiento, riesgo, país e industria) que no emiten dichos bonos. La muestra comprende 160 empresas emparejadas de 23 países y 9 sectores industriales, con datos recopilados entre 2013 y 2022. Esta aproximación, más potente y eficiente que las muestras independientes, permite contrastar empresas similares y controlar factores externos que pudieran sesgar los resultados, estableciendo así un marco comparativo sólido. Además, se incluyeron análisis de moderación para evaluar cómo ciertas características internas de la empresa —como crecimiento, rentabilidad y endeudamiento— influyen en la relación entre la emisión de bonos verdes y el desempeño medioambiental, proporcionando así un examen más detallado y preciso de las condiciones bajo las cuales la emisión de bonos verdes tiene mayor impacto. Los datos se obtuvieron de la base de datos Refinitiv Eikon, una plataforma de análisis financiero y datos de mercado ampliamente utilizada por inversores y profesionales del sector financiero.

El Capítulo 3 explora el papel de los bonos ESG como señales de mejora reputacional, distinguiendo entre la reducción del riesgo reputacional y el fortalecimiento de la reputación corporativa. Para ello, se construyó un panel de datos anuales de 500 empresas (3.500 observaciones) y se emplearon modelos de efectos fijos con errores estándar robustos. Asimismo, se llevaron a cabo análisis de moderación en datos de panel para examinar estas relaciones en contextos específicos (resultados previos en sostenibilidad y coste de la deuda). Los datos, correspondientes al período 2017-2023, provienen del ranking World's Most Admired Companies de la revista Fortune para la reputación corporativa y del índice de RepRisk (RRI) de la base de datos de RepRisk para el riesgo reputacional. Fortune es una de las revistas de negocios y finanzas más reconocidas a escala mundial, mientras que RepRisk es una herramienta de análisis de riesgos centrada en factores ESG.

Finalmente, en el Capítulo 4 se utiliza la metodología de estudio de eventos para evaluar la reacción del mercado ante la emisión de bonos ESG. Se analizó una muestra de 3.618 emisiones de bonos ESG realizadas por 957 empresas entre 2021 y 2023, con el fin de cuantificar la variación en los precios de las acciones alrededor de la fecha de emisión. La rentabilidad anormal acumulada (CAR, por sus siglas en inglés) se midió en distintas ventanas de eventos para determinar sus efectos en diversos intervalos temporales. Adicionalmente, se emplearon submuestras para comparar los resultados en función de la flexibilidad en el uso de los fondos recaudados. Los datos para este capítulo también se obtuvieron de Refinitiv Eikon.

La tesis doctoral busca contribuir al conocimiento sobre los bonos ESG mediante un análisis exhaustivo de su impacto en las empresas emisoras, abordándolos desde tres perspectivas fundamentales: el desempeño medioambiental, la reputación empresarial y la reacción del mercado bursátil en la fecha de emisión. La contribución de la tesis doctoral radica en aportar evidencia sobre finanzas sostenibles, la teoría de la ABV, la teoría de la señal y la EMH. En el ámbito de finanzas sostenibles, se demuestra cómo la emisión de bonos verdes impulsa el desempeño medioambiental, realza la importancia de factores internos y refuerza la reputación corporativa, aunque el mercado reacciona negativamente en la fecha de emisión. Respecto a la ABV, se constata que los bonos verdes canalizan la atención de directivos y mandos intermedios hacia objetivos de sostenibilidad, requiriendo recursos y un entorno adecuado para traducir dicha atención en mejoras del desempeño medioambiental. Desde la teoría de la señal, se confirma que los bonos ESG actúan como compromisos creíbles, con efectos reputacionales modulados por el historial sostenible y el coste asumido. En relación con la EMH, se evidencia la asimilación de información de sostenibilidad por parte del mercado, lo que modera el optimismo inicial.

La elección deliberada de estos tres ámbitos de análisis (desempeño medioambiental, reputación corporativa y reacción del mercado) permite captar el ciclo completo de creación y distribución de valor sostenible generado por la emisión de bonos ESG. En primer lugar, el desempeño medioambiental constata la internalización efectiva de los recursos captados, evidenciando la reconfiguración de rutinas y procesos que la ABV asocia con la reasignación de la atención directiva hacia objetivos de sostenibilidad. En segundo lugar, la posterior proyección de tales mejoras en la reputación corporativa se

sustenta en la teoría de la señal, según la cual la emisión de un bono ESG actúa como compromiso creíble cuyo valor depende de la coherencia observable entre promesa y resultado. Por último, la reacción del mercado bursátil ofrece una medida sintética de la valoración económica que los inversores conceden a esta trayectoria, al incorporar la información procedente del desempeño medioambiental, la percepción reputacional de los grupos de interés y, por último, toda la nueva información revelada en la fecha de emisión, en consonancia con la EMH. El análisis secuencial de estos efectos conecta, por tanto, el origen operativo de la sostenibilidad con su reconocimiento simbólico y, a su vez, con su traducción financiera. Esta triangulación evita visiones parciales, centradas solo en intangibles o solo en métricas de mercado, y demuestra que el impacto de los bonos ESG depende de la coherencia dinámica entre esfuerzo interno, narrativa reputacional y expectativas inversoras.

1.4 Estructura de la investigación

La presente tesis doctoral se ha estructurado en cinco capítulos organizados en tres secciones principales que permiten abarcar en profundidad las áreas temáticas clave para la investigación: una introducción (Capítulo 1), tres estudios de investigación que forman el núcleo central de la tesis doctoral (Capítulos 2, 3 y 4) y una sección final de conclusiones e implicaciones (Capítulo 5).

El Capítulo 1, que corresponde a la presente introducción, sienta las bases para el desarrollo de la tesis doctoral. Este capítulo introduce el contexto y relevancia de la investigación, estableciendo el marco conceptual de las finanzas sostenibles y los bonos ESG. Se presentan los antecedentes del estudio, la delimitación del objeto de investigación, los objetivos de la tesis doctoral y la estructura del trabajo. Se argumenta la importancia de analizar los bonos ESG desde distintas perspectivas, destacando su papel en el desempeño medioambiental, la reputación corporativa y la reacción del mercado bursátil.

El Capítulo 2, titulado *Green Bonds and Environmental Performance: The Effect of Management Attention*, explora cómo la emisión de bonos verdes puede orientar la atención de los directivos hacia la mejora del desempeño medioambiental y canalizarla al resto de la organización. Aunque diversos estudios señalan un posible impacto positivo en el desempeño medioamabiental de las empresas (Flammer, 2021; Benlemlih et al.,

2023), no todas logran la misma mejora (Fatica & Panzica, 2021). El Capítulo aplica el enfoque de la ABV (Ocasio & Joseph, 2018), subrayando que la emisión de bonos verdes actúa como un mecanismo para focalizar la atención en objetivos medioambientales concretos. No obstante, resalta que la sola emisión no garantiza un desempeño superior, pues también influyen la intensidad de los bonos (comparada con activos o deuda) y ciertas condiciones internas —como crecimiento, rentabilidad y endeudamiento— para convertir esa atención en mejoras tangibles.

Para poner a prueba estas hipótesis, se recopilaron datos de emisiones de bonos verdes entre 2013 y 2017, evaluando su desempeño medioambiental hasta 2022. La muestra se construyó mediante la técnica de emparejamiento, agrupando 80 empresas emisoras de bonos verdes frente a otras 80 no emisoras. A partir de esta comparación, los resultados revelan que aquellas empresas con una mayor intensidad de emisión, con un ritmo de crecimiento más alto y/o con capacidad de obtener recursos adicionales —ya sean internos o externos— logran una mejora medioambiental más notable.

El Capítulo contribuye tanto a la literatura de finanzas sostenibles como a la teoría ABV, al demostrar cómo los bonos verdes pueden reorientar la atención de los directivos y catalizar cambios positivos en materia medioambiental. Sin embargo, el análisis también recalca que dichos efectos están sujetos a las capacidades financieras y estratégicas de cada empresa, enfatizando la necesidad de integrar este financiamiento en una estrategia coherente y respaldada por recursos adecuados, con un compromiso real hacia la sostenibilidad a largo plazo.

El Capítulo 3, titulado *Sustainability Signals: The Effect of ESG Bonds on Reputational Improvements*, examina de qué modo la emisión de bonos ESG puede funcionar como una señal efectiva para mejorar la reputación corporativa y reducir el riesgo reputacional de las empresas emisoras. Basándose en la teoría de la señal, se enfatiza que estos instrumentos conllevan costes adicionales y son altamente observables, por lo que se consideran señales creíbles para distintos grupos de interés. Asimismo, se muestra cómo accionistas y otros grupos de interés interpretan de manera distinta el mensaje que proyectan estos bonos: los primeros se fijan más en los riesgos reputacionales, mientras los segundos se centran en la reputación global de la empresa.

El Capítulo también analiza cómo ciertos factores internos pueden amplificar o debilitar la señal de los bonos ESG, en concreto el desempeño sostenible previo y el coste de la deuda. Por un lado, se apunta que las empresas con una trayectoria sólida en sostenibilidad son más creibles al emitir estos instrumentos, pues su "coste de pérdida reputacional" es mayor si no cumplen las expectativas; en contraste, las empresas con bajo desempeño despiertan recelos y, lejos de mejorar su imagen, pueden agravar las dudas sobre su compromiso. Por otro lado, se expone que un mayor coste de la deuda refuerza la credibilidad de la emisión, al evidenciar el esfuerzo adicional que la empresa asume para sostener sus objetivos de sostenibilidad.

Para contrastar estas hipótesis, se recopilaron datos de 500 empresas presentes en el ranking Fortune World's Most Admired Firms, complementados con la evaluación de reputación en RepRisk y la información financiera de Refinitiv Eikon. A través de un modelo de efectos fijos con errores robustos, los resultados confirman que la emisión de bonos ESG mejora la reputación corporativa y reduce el riesgo reputacional, sobre todo en empresas con un desempeño sostenible sólido y un alto coste de financiación. En conjunto, el Capítulo destaca la utilidad de los bonos ESG como herramientas tanto proactivas (para impulsar la reputación) como defensivas (para mitigar riesgos), siempre que se inserten en una estrategia sostenible coherente y reforzada con los recursos y capacidades adecuados.

El Capítulo 4, titulado *ESG Bonds and Stock Market Reaction: Event Study*, aborda cómo reacciona el mercado bursátil en torno a la fecha de emisión efectiva de los bonos ESG. A diferencia de investigaciones previas que lo analizaron en la fecha del anuncio de la emisión (Flammer, 2021; Tang and Zhang, 2020; Mathew and Sivaprasad, 2024), este Capítulo analiza la respuesta del precio de las acciones cuando la emisión se materializa, momento en que se difunde información adicional sobre aspectos como el precio de colocación, los inversores participantes o la demanda efectiva de los bonos. Basándose en la hipótesis de mercados eficientes (EMH), se explora cómo las expectativas iniciales positivas en la fecha del anuncio pueden disiparse al incorporar la nueva información (costes y riesgos reales de los compromisos de sostenibilidad).

El Capítulo también examina el grado de flexibilidad en el uso de los fondos recaudados. Por un lado, los verdes, sociales y sostenibles (no SLBs) destinan los recursos a proyectos

específicos, lo que envía una señal más clara de compromiso sostenible; sin embargo, en la fecha de emisión puede suscitar incertidumbre acerca de la rentabilidad y la ejecución de dichos proyectos. Por otro lado, los bonos vinculados a la sostenibilidad (SLBs) ofrecen mayor flexibilidad, puesto que no condicionan estrictamente el destino de los fondos, lo que reduce la fuerza de la señal y, con ello, su efecto en el precio de las acciones. Asimismo, el Capítulo resalta que la emisión de bonos ESG por parte de entidades no financieras provoca un mayor ajuste negativo en la cotización, al percibirse un mayor impacto directo en sus recursos y actividades.

Para verificar estas hipótesis, se empleó la metodología de estudio de eventos en una muestra de 3.618 emisiones pertenecientes a 957 empresas entre 2021 y 2023, estimando las variaciones anormales de rentabilidad (CAR) en intervalos de ventana de [-5,5] y [-10,10] días alrededor de la fecha de emisión. Los resultados evidencian una reacción negativa del mercado al hacerse efectivo el compromiso financiero que conllevan los bonos ESG, efecto más pronunciado cuando las empresas son no financieras y cuando los recursos se enfocan en proyectos concretos (no SLBs). El Capítulo concluye subrayando la importancia de evaluar la emisión de bonos ESG no solo como señal de sostenibilidad, sino también como factor de coste y riesgo que los inversores ponderan a la hora de ajustar sus valoraciones.

El Capítulo 5 presenta las principales conclusiones e implicaciones de la investigación. Se resumen los hallazgos de los Capítulos previos y se discuten sus aportaciones teóricas y prácticas. Además, se identifican las limitaciones del estudio y se proponen futuras líneas de investigación. Este Capítulo también proporciona recomendaciones para empresas emisoras, inversionistas y reguladores interesados en mejorar la efectividad de los bonos ESG como herramienta de financiación sostenible.

Referencias

Affolter, B., Ciarla, E., Meyer, J., & Sugandhita, S. (2024). Signaling sustainability: Differential reaction of the stock market following the announcement of sustainability-linked bonds. Finance Research Letters, 63, 105261.

Arévalo, G., González, M., Guzmán, A., & Trujillo, M. A. (2024). The value effect of sustainability: evidence from Latin American ESG bond market. Journal of Sustainable Finance & Investment, 1-22.

Bergh, D. D., Connelly, B. L., Ketchen Jr, D. J., & Shannon, L. M. (2014). Signaling theory and equilibrium in strategic management research: An assessment and a research agenda. *Journal of Management Studies*, *51*(8), 1334-1360.

Benlemlih, M., Jaballah, J., & Kermiche, L. (2023). Does financing strategy accelerate corporate energy transition? Evidence from green bonds. *Business Strategy and the Environment*, *32*(1), 878-889.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, *37*(1), 39-67.

Environmental Finance. (2025). Database Environmental Finance. Accessed 14 February 2025.

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment*, *30*(5), 2688-2701.

Feldhütter, P., Halskov, K., & Krebbers, A. (2024). Pricing of sustainability-linked bonds. Journal of Financial Economics, 162, 103944.

Flammer, C. (2020). Green bonds: effectiveness and implications for public policy. *Environmental and Energy Policy and the Economy*, *1*(1), 95-128.

Flammer, C. (2021). Corporate green bonds. Journal of Financial Economics, 142(2), 499-516.

Gallo, P. J., Sosa, S., & Velez-Calle, A. (2023). Business for peace: How entrepreneuring contributes to Sustainable Development Goal 16. *BRQ Business Research Quarterly*, *26*(1), 62-78.

Gonzalez-Ruiz, J. D., Marín-Rodríguez, N. J., & Weber, O. (2024). New insights on social finance research in the sustainable development context. *Business Strategy & Development*, *7*(1), e342.

ICMA (2020a). *Green, social and sustainability bonds: A high-level mapping to the sustainable development goals 2020*. Available at: http://surl.li/ihfnyi (accessed 18 September 2024).

ICMA (2020b). *Sustainability-linked bonds principles. Voluntary process guidelines 2020*. Available at: http://surl.li/hqvsal (accessed 18 September 2024).

ICMA (2020c). *Sustainable Finance High-level definitions*. Zürich: International Capital Market Association. Available at*:* http://surl.li/fbutms (accessed 18 September 2024).

Larcker, D. F., & Watts, E. M. (2020). Where's the greenium?. *Journal of Accounting and Economics*, *69*(2-3), 101312.

Lau, P., Sze, A., Wan, W., & Wong, A. (2022). The economics of the Greenium: How much is the world willing to pay to save the earth? *Environmental and Resource Economics*, *81*(2), 379-408.

Lian, J., Huang, X., & Wu, X. (2024). How green bonds promote firms' green collaborative innovation?. *Corporate Social Responsibility and Environmental Management*, *31*(3), 2109-2126.

Mathew, S., & Sivaprasad, S. (2024). An empirical analysis of corporate sustainability bonds. *Business Strategy and the Environment*, *33*(4), 3299-3316.

Montiel, I., Gallo, P. J., & Antolin-Lopez, R. (2020). What on Earth should managers learn about corporate sustainability? A threshold concept approach. *Journal of Business Ethics*, *162*, 857-880.

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*, *18*(S1), 187-206.

Ridge, J. W., Johnson, S., Hill, A. D., & Bolton, J. (2017). The role of top management team attention in new product introductions. *Journal of Business Research*, *70*, 17-24.

Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic Management Journal*, *23*(12), 1077-1093.

Ross, S. A. (1977). The determination of financial structure: The incentive-signaling approach. *The Bell Journal of Economics*, *8*(1), 23-40.

Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics*, 87, 355-374.

Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds?. *Journal of Corporate Finance*, *61*, 101427.

Tsai, K. H., & Liao, Y. C. (2017). Sustainability strategy and eco-innovation: A moderation model. *Business Strategy and the Environment*, *26*(4), 426-437.

Yang, Q., Geng, R., & Feng, T. (2020). Does the configuration of macro-and micro-institutional environments affect the effectiveness of green supply chain integration?. *Business Strategy and the Environment*, *29*(4), 1695-1713.

Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of banking & finance*, *98*, 39-60.

CAPÍTULO 2:

GREEN BONDS AND ENVIRONMENTAL PERFORMANCE: THE EFFECT OF MANAGEMENT ATTENTION

2.1. Introduction

In recent years, the issuance of corporate green bonds has experienced exponential growth (Barua & Chiesa, 2019). To illustrate this trend, in 2013, corporate green bonds were virtually non-existent, with a total issuance of only $9.2 billion. However, in 2022, the volume of green bonds issued skyrocketed to nearly $560 billion, according to Environmental Finance (2023). This significant growth underscores the growing interest in green bonds within the business and financial spheres. Corporate green bonds are any bonds in which funds are applied exclusively to finance or refinance, entirely or partly, eligible green projects (i.e., those showing clear environmental benefits), whether new and/or existing, aligned with the four main components of the Green Bond Principles (ICMA, 2018). Corporate green bonds have gained significant attention as a mechanism for directing funds towards environmentally sustainable projects. They play a crucial role in promoting sustainable development by allocating proceeds solely to projects with evident sustainable benefits. The growth of green bond issuance is attributed to increasing environmental awareness, government commitments, regulatory incentives, investor demand for sustainable criteria, standards and certifications, financial innovation, and competitive performance. These factors signify the alignment of financial and environmental objectives in today's financial market.

Researchers have examined whether there is a market premium associated with the issuance of corporate green bonds (Flammer, 2021; Larcker & Watts, 2020; Tang & Zhang, 2020; Zerbib, 2019), investigating reputational incentives (Cheong & Choi, 2020), exploring investors' attraction (Flammer et al., 2020), and analyzing regulatory factors (Tolliver et al., 2020). Additionally, there is a line of research that analyzes the effect of green bond issuance on firms' environmental performance. Though it might be reasonable to assume that corporate green bonds have a positive impact on environmental performance (Benlemlih et al., 2023; Flammer, 2021), previous studies suggest that these improvements are not uniform across all firms (Fatica & Panzica, 2021). For instance, Fatica & Panzica (2021) have found that CO_2 emission reductions are more pronounced and enduring for new projects and emissions subject to external review and auditing. Our aim is to build upon previous studies that investigate the circumstances in which corporate green bond issuance improves environmental performance. Our research questions are as

follows: Do corporate green bonds issuers improve their environmental performance after issuing green bonds? Under which circumstances is the effect of corporate green bonds on environmental performance improvement higher?

The amount of corporate green bond issuances is usually small compared to the total long-term debt of the issuing firm. Additionally, these bonds are applied to specific project, which often address a small percentage of the total environmental impact of the issuing firms. However, even if the amount of green bonds issued are financially negligible for a firm, other possible effects must be considered, such as those effects related to the distribution of attention within the firm. Based on the attention-based view (ABV) (Andersén, 2022; Ha, 2021; Bhandari et al., 2020; Siren et al., 2020; Ocasio & Joseph, 2018; Ridge et al., 2017), we propose that the issuance of green bonds serves as a valuable mechanism for directing attention towards environmental issues, spanning from senior management to managers at all levels and encompassing all members of the firm. Under the assumption of the limited rationality of a manager (Eklund & Mannor, 2021), the ABV states that their decisions depend on where they managers focus their attention. In addition, from the perspective of attention distribution, ABV acknowledges that rationally allocating limited attention resources to different aspects of business strategy is a challenge that firms have faced (Ocasio, 1997). Further, green bond intensity—the size of the bond relative to the firm's assets and total indebtedness—may affect the ability to shift attention to environmental issues in the entire firm. Additionally, we argue that the internal conditions of firms—growth, profitability, and indebtedness—affect how this attention can be translated into actions implying an improvement in environmental performance.

For this study, we collected data on green bond issuance between 2013 and 2017 from Refinitiv to assess the impact of issuance over the next five years up to 2022; therefore, our sample spans from 2013 to 2022 (ten years). Further, we tested these relationships using a sample based on paired methodology involving a pairing of 80 firms that have issued corporate green bonds with firms that have not issued any corporate green bonds (160 firms in total), based on an approximation in size, performance, risk, country, and industry. This methodology is more powerful and more efficient than independently selected samples as it allows comparison of similar firms (Cochran, 1953; Ortiz-de-Mandojana & Bansal, 2016). Our findings highlight the relevance of both green bond

intensity and internal conditions in influencing the impact of green bonds on environmental performance. Specifically, firms with higher green bond intensity, those experiencing growth, and/or those securing additional financial resources (internally or externally) show superior environmental performance improvement.

Our study makes two contributions to the literature on sustainable finance and the ABV. First, we add to the growing body of research on sustainable finance by providing new evidence on the impact of green bonds in facilitating firms' environmental performance improvements. Specifically, our study incorporates the ABV as a theoretical framework to provide a potential explanation of the conflicting empirical findings. We find that the effectiveness of issuing a corporate green bond in directing managers' attention towards environmental strategies and initiatives, leading to subsequent improvements in environmental performance, depends on both the intensity of the green bond and the internal conditions of the firm. Second, our findings contribute to the ABV by highlighting the significance of the attention mechanism's size in driving managers' focus at all levels towards specific environmental issues, thereby enhancing performance in those areas. Furthermore, our results point out the relationship between attention and performance, revealing that simply increasing attention is insufficient yield performance impact. Firms must also have additional internal conditions in place to translate this attention into actions that improve performance.

The paper is organized as follows: the next section reviews the theoretical background; the third section outlines the development of hypotheses; the fourth and fifth sections detail our research methodology and results; the sixth section discusses the findings, and the final section presents the main conclusions, limitations, and future research implications.

2.2. Theoretical background

2.2.1 Sustainable financial instruments: Corporate green bonds

Sustainable finance allows for the use of different financing products promoting sustainable development: investment funds, bonds, and social venture capital, with the issuance of private debt (bonds) being the most important product for financing projects aimed at sustainable objectives (Environmental Finance, 2023). Assessing the issuance

of private debt from listed firms, we find green bonds (positive impact on the environment), social bonds (positive impact on society and community), sustainable bonds (positive impact on the environment and society), and sustainability-related bonds (linked to the achievement or improvement of certain environmental, social and/or corporate governance metrics) (ICMA, 2020a, 2021b). Regarding Environmental, Social, and Governance bond issuance, green bonds are its star product, accounting for 76% of this form of bond issuance until 2022 (Refinitiv Eikon, 2022), reaching a volume of approximately $560 billion in 2022 (Environmental Finance, 2023).

Previous literature on green bonds has primarily focused on studying the existence of a market premium in the issuance of corporate green bonds (Flammer, 2021; Larcker & Watts, 2020; Tang & Zhang, 2020; Zerbib, 2019), examining reputational incentives in the issuance of corporate green bonds (Cheong & Choi, 2020), and highlighting the pressure exerted by investors as one of the reasons for issuing green bonds (Flammer et al., 2020). Researchers have also explored the role of regulatory factors in green bonds (Tolliver et al., 2020), revealing significant disparities in international progress regarding the regulatory environment of green bonds. In addition, research has investigated whether the issuance of corporate green bonds is associated with an improvement in the environmental performance of firms. Flammer (2021) argues that corporate green bond issuers improve their environmental impact more than those not issuing this type of asset (i.e., higher environmental ratings and lower CO_2 emissions). However, some studies have aimed to determine the circumstances in which corporate green bond issuance has a greater impact on environmental performance. For example, Fatica & Panzica (2021) show that not all corporate green bond issuances demonstrate the same decrease in the carbon intensity of their assets after issuing green bonds. The reduction in emissions is more pronounced, significant, and lasting in new projects than in emissions for project refinancing purposes. The reduction in emissions is also greater in corporate green bonds that undergo external review and are audited, as well as those issued after the Paris Agreement (Fatica & Panzica, 2021). More recently, Benlemlih et al. (2023) claim that green bond issuances have a positive impact on firms' environmental performance, comparing the environmental ratings of issuing firms with non-issuing firms. However, their results are less conclusive in terms of CO_2 emissions. They do not observe a significant reduction in CO_2 emissions for firms issuing green bonds compared to

equivalent firms not issuing green bonds. Therefore, previous studies suggest variations in environmental performance among firms after the issuance of green bonds; however, the internal contexts in this relationship remain insufficiently explored. Accordingly, this study, grounded in the ABV theory, seeks to elucidate the circumstances within firms that contribute to or hinder such improvements. By addressing this gap in the analysis of the connection between green bond issuance and environmental performance, we explore diverse internal contexts of firms, integrating the ABV theory to elucidate this relationship.

2.2.2 ABV and environmental performance

The ABV is an important theory in management research (Bhandari et al., 2020; Siren et al., 2020; Ocasio & Joseph, 2018; Ridge et al., 2017) and environmental performance (Andersén, 2022; Ha, 2021). The ABV theory argues that the behavior of firms is the result of how they channel and distribute the attention of their managers (Ocasio, 1997). The seed of this theory goes back to Simon (1947) and has been developed over years in studies by March and Simon (1958), Cyert and March (1963), Cohen et al. (1972), March and Olsen (1976), and Friedland (1991), among others. However, not until the work of Ocasio (1997) was an explicit structure of the ABV devised. Ocasio (1997) defines "attention" as the process by which the managers of an organization allocate limited time and energy to be aware of, code, explain, and focus on business attention according to the three principles: focus of attention, situated attention, and structural distribution of attention. The focus of attention principle states that the issues to which decision-makers direct their attention depend on the questions and answers about which they are aware. Situated attention states that the issues decision-makers consider and their responses depend on their specific environment and situation. In addition, the importance of situational or contingent factors in explaining their decision-making process is highlighted. Finally, the principle of the structural distribution of attention describes how the focus of individuals' attention is shaped and governed by social, economic, and cultural processes, as well as communication.

The ABV framework begins with the premise that decision-makers' actions are determined by the allocation of their limited attention bandwidth (Eklund & Mannor, 2021). Normally, top management plays a crucial role in decision-making processes. The

extent to which the top management team focuses on environmental policies is positively associated with the adoption of an environmental innovation strategy (Liao, et al., 2022).

The individual attentional perspectives of top management play a pivotal role in determining organizational behavior (Ocasio, 2011). The topics that managers choose to focus their attention on are influenced not only by their individual attentional perspectives but also by the situational context in which they operate, which Ocasio (1997) refers to as situated attention. Hence, management decision-making is not isolated but is often prompted by various organizational contexts that may draw attention to different issues (Tuggle et al., 2010). The importance of situated attention has been validated in different studies on ABV, such as examining the impact of "newness" in a business opportunity (Shepherd et al., 2017).

According to the Attention-Based View (ABV), the focus of attention not only shapes the specific organizational activities in which top management directly participates but also indirectly influences the entire organization. This occurs through procedural and communication channels, which guide how other members of the organization allocate their own attention (Ocasio, 1997). Consequently, the issues and responses that occupy other organizational members are significantly affected by where top management directs its attention (Ocasio, 1997; Ocasio & Joseph, 2018).

In large firms, decision-making is not limited to top management; it is a dynamic, distributed process that involves middle management and, ultimately, the entire organization. Therefore, ensuring that attention flows smoothly from top management to these middle levels requires solid governance mechanisms (Dutton & Ashford, 1993). In line with this perspective, it is essential not only to focus top management attention on green initiatives but also to effectively engage employees in the firm's environmental objectives. Indeed, treating employees as internal stakeholders strengthens the adoption of proactive sustainability strategies, which ultimately leads to improved environmental performance (Alt, Díez-de-Castro, & Lloréns-Montes, 2015). Nevertheless, this proactive perspective can lead to certain simplistic assumptions: there is a tendency to think that environmental improvements arise almost automatically upon issuing green bonds. According to Aragón-Correa and Rubio-López (2007), there are various myths and misunderstandings surrounding proactive environmental strategies. This suggests the

need for a more nuanced analysis of how green bonds actually influence environmental performance.

2.3. Hypotheses development

2.3.1 The effect of corporate green bonds on environmental performance

To improve environmental performance, previous literature has shown that financial resources are necessary (Berrone & Gómez-Mejía, 2009) but insufficient to achieve high environmental performance levels. Improving environmental performance requires a comprehensive view of the entire organization (Angell & Klassen, 1999) and effective integration of sustainable practices into business activities (Wagner, 2015). This idea implies that environmental issues have become important not only for the various functional areas but also for all levels of the organization. Additionally, improvements in environmental performance require stakeholder support (Sharma & Vredenburg, 1998). A firm must possesses dynamic capabilities (Teece, 2007) to adapt to its environment, evolve, and renew itself over time (Wang & Ahmed, 2007) to improve environmental performance.

To achieve these green resources that allow the effective improvement of environmental performance, the firm requires not only having the financial funds but also the attention of managers at all levels on the firm's environmental performance (Symeou, 2019), because if resources are obtained from green bonds and managers do not spend them effectively, this will produce only slight performance improvements. If firms want to improve their environmental performance, they must overcome the limitation of managers' attention and focus their attention on environmental issues. The degree to which managers drive environmental strategies, may depend on the leadership capacity and decision-making power of the executive team (Walls & Berrone, 2017), suggesting that managerial attention is a key factor in improving environmental performance. Also, the engagement and voluntary behaviors of employees—often referred to as organizational citizenship behaviors for the environment—play a vital role in successfully adopting new environmental practices (Alt & Spitzeck, 2016). This focus on improving environmental performance is stimulated by the firm's first issuance of a green bond. The issuance of a green bond renders the firm aware of improving its environmental

performance. It shifts the attention of senior managers to include lower-level managers, thus giving greater importance to the firm's strategic planning process. Therefore, the issuance of a green bond, which is the decision of senior management, shifts the attention of improving the environmental performance of the firm from top management to lower-level managers, the rest of the organization, and stakeholders by encouraging them to be aware of this as it functions as a distribution mechanism. Consequently, a comprehensive approach to improve environmental performance is achieved at all levels of the organization (Aragón-Correa, 1998). Therefore, we propose:

Hypothesis 1. The issuance of corporate green bonds improves the environmental performance of the issuing firms**.**

2.3.2. Corporate green bonds intensity and environmental performance

The topics that are the focus of attention for managers and the importance managers attach to them are determined by the individual's attentional perspectives and context (Tuggle et al., 2010). In ABV, this is called situated attention (Ocasio, 1997). This means that decision-making within the firm is not performed in isolation. Instead, it is often triggered (Ocasio, 1997) by different contextual factors within the firm. Shepherd et al. (2017) posit that the intensity of "novelty" on a specific topic within the firm, such as the "novelty" in a business opportunity, makes the entire organization drive greater attention toward that topic. However, if this intensity decreases, so does the attraction of senior management's attention to this issue. Therefore, attention is diverted to other issues within the firm (Barnett, 2005).

Once it is established that the issuance of the green bond is an appeal for attention and that this attention is a mechanism to be transferred to the rest of the organization, the intensity of the green bond produces a greater signal that is transferred to the rest of the organization. The intensity and continuity of green bond issuances can largely depend on corporate governance structures and the involvement of the board of directors, which is consistent with the literature linking good governance with better environmental performance (Aguilera et al., 2021; Walls et al., 2012).Therefore, the higher the bond intensity, the greater the attention directed by managers toward environmental issues and the greater its channeling to the remainder of the organization. This helps integration and

results in a more intense improvement in the firm's environmental performance. Therefore, the intensity of the green bond is relevant, and we propose:

Hypothesis 2. Corporate green bond intensity positively affects the improvement of environmental performance of firms.

2.3.3. The moderating effect of growth environmental performance

Although the issuance of a green bond is useful for disseminating attention to environmental issues throughout the organization and helps improve the environmental performance of the issuing firm, this effectiveness is not homogeneous (Fatica & Panzica, 2021). Different internal factors influence and restrict managers' allocation of attention to different topics and their selection of alternative behaviors (Pfeffer & Salancik, 2003). We believe that the effectiveness of the issuance of the green bond and the attracted attention of the managers will depend on internal conditions of the firms related to their growth and management of their resources, both internal and external. These internal conditions can enhance or diminish this improvement in environmental performance through the issuance of this type of asset.

Improving environmental performance requires innovation, creativity, and risk-taking through more proactive and innovative environmental practices (Adams et al., 2016). Growing firms are usually organizations in which the senior management style is entrepreneurial, more likely to take risks while pursuing their business strategy, encourages change and innovation, and competes aggressively with other firms (Covin & Slevin, 1989). These growing firms are increasing their production capacity and are characterized as creative, innovative, and risk-tolerant.

To carry out this improvement in environmental performance, more proactive practices (innovation) (Dost et al., 2019; Potrich et al., 2019) as well as less proactive ones (emission reduction and resource use) may be performed. The difference lies in the double externality of environmental innovation (Rennings, 2000) since it requires significant investments and a long period of return on investment (Adams et al., 2016). Environmental innovation is defined as improvements or inventions intended to reduce the environmental impact of business processes through the introduction of new processes, equipment, institutions, practices, techniques, or products (Albort-Morant et

al., 2018). It is the strategy that will intensify the managers' attention to environmental performance because this will allow them to seek new investment opportunities.

Furthermore, if a firm has the attention of managers to improve its environmental performance after the issuance of the green bond and this aspect intensifies with innovation (creativity), implying that the firm is growing, this will mean that the improvement is greater. However, if the firm is not growing, the attention of managers and the entire organization may be diverted to other, more short-term issues. Therefore, we propose:

Hypothesis 3. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are growing.

2.3.4. The moderating effect of financial resources on environmental performance

Resource endowment has an important influence on the selection of the firm's strategy (Oliver, 1997) and limits its actions, implying that the extent to which a firm adopts improved environmental performance may depend on its available resources (Sharma & Henriques, 2005). To improve environmental performance, in addition to the attention by firm management, financial resources are also needed to execute the firm's new environmental policies (Berrone & Gómez-Mejía, 2009). Financial resources are key to undertaking internal changes to improve the environmental performance of firms. Furthermore, in addition to the resources obtained with the issuance of the green bond, extra resources are needed since the amount obtained through this asset is not large. These extra resources may be obtained internally or externally.

Internally, the extra resources can be obtained by improving financial performance through increasing the firm's profitability. This improvement in financial performance is thus useful for improving environmental performance since this requires long-term thinking (Yadav et al., 2007) and an increased commitment of resources (Wang et al., 2018). With the issuance of green bonds, managers' attention is attracted towards developing new environmental practices. These include, for example, the creation of new green products and processes (Covin & Slevin, 1989) that may have a major impact on the environmental (Huang & Li, 2017) and financial (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Chen et al., 2006; Dangelico & Pujari, 2010) performance of firms.

This improved financial performance means more resources can be reinvested in new environmental projects, as they have attracted managers' attention. Conversely, it has been shown that economic barriers hinder this improvement in environmental performance (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013) since managers' attention and the firm's strategy will be focused on saving itself and not on improving its environmental performance. Therefore, we propose:

Hypothesis 4a. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are improving their financial performance.

Improving environmental performance requires greater access to external resources obtained by seeking external financing, whether private or public. The ABV theory establishes that the issues on which managers focus their attention are determined by their internal perspectives of attention and the interpretation of external events and context (Ocasio, 1997; Tuggle et al., 2010). In addition to internal financial resources, stronger environmental practices require additional external resources. Therefore, if the firm obtains financing through debt issuance, it will have extra resources to help managers perform the required investments to improve their environmental performance. Therefore, we propose:

Hypothesis 4b. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are increasing their indebtedness.

Table 2.1 is a summary of the literature used in each of the hypotheses in section 2.3.

Table 2.1. Hypotheses and literature

Hypothesis	Literature
Hypothesis 1. The issuance of corporate green bonds improves the environmental performance of the issuing firms	Alt & Spitzeck, 2016; Angell & Klassen, 1999; Aragón-Correa, 1998; Benlemlih et al. 2023; Berrone & Gómez-Mejía, 2009; Fatica & Panzica, 2021; Flammer 2021; Rueda-Manzanares et al., 2008; Sharma & Vredenburg, 1998; Teece, 2007; Wagner, 2015; Wang & Ahmed, 2007
Hypothesis 2. Corporate green bond intensity positively affects the improvement of environmental performance of firms	Aguilera et al., 2021; Barnett, 2005; Ocasio, 1997; Tuggle et al., 2010; Shepherd et al., 2017
Hypothesis 3. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are growing	Adams et al., 2016; Albort-Morant et al., 2018; Covin & Slevin, 1989; Dost et al., 2019; Fatica & Panzica, 2021; Pfeffer & Salancik, 2003; Potrich et al., 2019; Rennings, 2000
Hypothesis 4a. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are improving their financial performance	Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Berrone & Gómez-Mejía, 2009; Chen et al., 2006; Covin & Slevin, 1989; Dangelico & Pujari, 2010; Huang & Li, 2017; Oliver, 1997; Sharma & Henriques, 2005; Wang et al., 2018; Yadav et al., 2007
Hypothesis 4b. The positive effect of corporate green bond issuance on environmental performance is stronger if firms are increasing their indebtedness	Berrone & Gómez-Mejía, 2009; Ocasio, 1997; Oliver, 1997; Tuggle et al., 2010; Sharma & Henriques, 2005

Source: Own elaboration.

2.4. Methodology

2.4.1 Data collection and sampling

We utilize the matching method to select our sample as it reduces bias and increases accuracy in empirical studies (Rubin, 1973). In management studies, the matching method is often used to study the evolution of different groups of firms (Ferrier et al., 1999; Kassinis & Vafeas, 2002; Mallette, 1991; Ortiz-de-Mandojana & Bansal, 2016; Short & Toffel, 2010). As an analytical tool, the matching methodology is more effective than independently selected samples because it allows the results of similar groups of

firms to be compared (Cochran, 1953). When describing our sample, we identified the firms issuing corporate green bonds as the "treated" group and pairs as the "control" group.

To compile the "treated" group, we first collected all corporate green bond issuance data between 2013 and 2017 from the financial data provider Refinitiv Eikon, obtaining a total of 778 issuances from 233 firms. We chose 2013 as the initial year because this is when the issuance of green bonds took off, and 2017 was chosen because this was the final year to measure the improvement in environmental performance in a period of at least five years after the issuances. Therefore, our sample has data in the period from 2013 to 2022. This time frame allows for a comprehensive examination of the progression of environmental performance, acknowledging the premise that the benefits of a robust environmental strategy manifest over the long term (Aragón-Correa, 1998; Aragón-Correa & Sharma, 2003). Once the sample of treated firms was obtained, we verified the availability of Refinitiv Eikon's environmental data. Of the 233 firms, we had data on the variable "Environmental Pillar Score" of the year of the first issuance from only 86 firms.

Next, we applied the matchmaking method to identify the control group. Pairs should be formed based on a defined set of characteristics likely to be associated with the analysis result (McKinlay, 1977). Our analysis matched firms by total assets, net income before taxes, revenue per share, total long-term debt, sector, and country. To search for matches, we considered the entire universe of firms available in Eikon, with the available data for the "Environment Pillar Score" variable. Concretely, for each of the 86 treated firms, we collected data on all firms in the same sector (nine sectors) and country (23 countries) in the year of the first issuance. That result in a population of 2,702 potential control firms. We performed matchmaking by considering the total assets, net income before taxes, revenue per share, total long-term debt, sector, and country (Ortiz-de-Mandojana & Bansal, 2016) of the year of the first issuance.

Of each of the 86 groupings obtained, we performed a clustering through Python using Euclidean (the straight line between two points) distance as a reference for measure, obtaining the two firms with the greatest match according to total assets, net income before taxes, revenue per share, total long-term debt. Furthermore, we require that the control firm belongs to the same sector and country as the treated firms. Once the pairing

according to these six variables had been performed, we chose the firm with the shortest Euclidean distance to the treated firm. In the matchmaking process, we observed that four firms had the same control firm. We chose the one with the shortest distance for these four firms, discarding the other three firms. The other three firms were also eliminated because of incomplete records. Finally, we had a sample of 80 firms that issued corporate green bonds and 80 firms that did not, for a total of 160 firms from 23 countries and nine sectors.

The paired t-tests show that the mean differences between corporate green bond issuers and control firms are not significant ($p>0.05$) for any of the variables with which the pairing has been performed, including firms showing similar total assets, net income before taxes, revenue per share, and total long-term debt during the year of issuance of the first green bond (see Table 2.2). The pairs also belonged to the same country and sector.

Table 2.2. Descriptive statistics[a]

	Treated firms		**Control firms**		
	Mean	**S.D.**	**Mean**	**S.D.**	**t-test**
1. Total Assets[b]	12.33	47.90	8.70	40.30	t=0.60
2. Net income before taxes[b]	.21	.99	.08	.37	t=0.31
3. Revenue per share[c]	7.41	42.31	3.05	17.93	t=0.40
4. Total long-term debt[b]	1.58	6.11	.36	1.15	t=0.08

[a] N = 80 pairs.
[b] Expressed in trillions of US dollars.
[c] Expressed in thousands of US dollars.

2.4.2 Variables

2.4.2.1 Improved environmental performance

Our dependent variable is the improvement in environmental performance that we measured using the environmental performance scores available in the Refinitiv Eikon database. This variable is the weighted average of a firm's relative rating based on the reported environmental information and the three resulting environmental scores

(innovation, emissions, and resource usage). The value of this index ranges from 0 to 100, where higher values represent better environmental performance. To calculate the improvement of the environmental variable, the difference between the year of emission and the following five years was considered.

2.4.2.2 Green bonds

We considered the issuance (or non-issuance) of a green bond by the firm. Therefore, this variable is dichotomous and coded with a value of 1 if the firm issued green bonds and 0 if the firm did not issue any green bonds.

2.4.2.3 Green bond intensity

To measure *green bond intensity*, we considered, the quotient between the amount of green bonds issued during the first year of issuance and the total assets of that year to measure *bond intensity* according to the size of the firm. Furthermore, we considered the quotient between the amount of green bonds issued during the first year of issuance and the total long-term debt of that year to measure bond intensity according to obtained financing. These two independent variables were used to test H2.

2.4.2.4 Growth

We measured *growth* by considering the variation of total assets during the five years following the issuance of the firm's first green bond with the growth of total assets. Previous literature has used the total assets to measure the firm's size (De Villiers et al., 2011).

2.4.2.5 Additional financial resources

First, we measured additional internal financial resources through *financial performance*, consisting of the variation of the return on assets (ROA) during the five years following the issuance of the first green bond. The ROA is one of the financial measures most commonly used to assess the financial performance of a firm's operations (Murphy et al., 1996). Therefore, we measured the improvement of financial performance by considering the variation in ROA. Second, we measured the additional external financial resources through *indebtedness* measured by the variation of the total long-term debt during the five

years following the issuance of the first green bond. This was done to observe if the firm was increasing or decreasing its level of indebtedness relative to the starting year (the year of the first issuance).

2.4.2.6 Control variables

We controlled several factors that can influence the improvement of firms' environmental performance. First, we controlled for the firm's *age*, measuring it from the date of the IPO. Older firms are more likely to have the infrastructure required to manage environmental issues at lower costs (Mohan-Neill, 1995). Second, we used *leverage* as a control variable, calculating the ratio of Total Long-Term Debt to total assets (Balakrishnan & Fox, 1993; De Villiers et al., 2011). Third, we controlled the firm's *systematic risk* through its beta factor, as Roberts (1992) and Cormier and Magnan (2004) find that low volatility improves a firm's ability to make environmental efforts as a result of having more stable economic performance. Finally, we controlled the *year of issuance of the first green bond* by the firm (2013, 2014, 2015, 2016, and 2017) as the year of the first issuance variable. In our model, we only considered green bond issues in the first year of issuance by the issuing firm. Table 2.3 summarizes all variables.

Table 3.3. Definitions of variables

Variable	Type	Definition
		Dependent variable
Environmental Performance	Continuous	Difference of the Environmental Pillar Score available in the Refinitiv Eikon database between the year of issuance of a green bond and the following five years.
		Independent variables
Green Bonds	Binary (0,1)	Coded 1 if the firm issues a green bond and 0 otherwise.
Green Bond Intensity 1	Continuous	Amount of green bonds issued during the first year of issuance, divided by Total Assets.
Green Bond Intensity 1	Continuous	Amount of green bonds issued during the first year of issuance, divided by Total Long-Term Debt.
		Moderating variables
Growth	Continuous	Difference in Total Assets between the year of issuance of a green bond and the following five years.
Financial Performance	Continuous	Difference in Return on Assets between the year of issuance of a green bond and the following five years.
Indebtedness	Continuous	Difference in Total Long-Term Debt between the year of issuance of a green bond and the following five years.
		Control variables
Age	Continuous	Time elapsed since the firm's IPO, in years.
Leverage	Continuous	Total Long-Term Debt, divided by Total Assets.
Systematic Risk	Continuous	Measured through its beta factor.
Year 1º E.	Dummy	Year of issuance of the first green bond by the firm (2013, 2014, 2015, 2016, and 2017).

Source: Own elaboration.

2.4.3 Data analyses

We had a paired sample; thus, we used linear and moderating regression grouped by pairs instead of randomly grouped to test our hypotheses so that the correlation matrix considers that the firms are not independent but are constructed in pairs. More precisely, we estimated the following regression for firm i in year t:

$$\text{ENVIRONMENTAL PERFORMANCE}_{it} = \alpha_i + \beta 1\ \text{INDEPENDET VARIABLE}_{it} + \beta 2\ \text{MODERATING VARIABLE}_{it} + (\beta 3\ \text{INDEPENDET VARIABLE}_{it} \text{ x MODERATING VARIABLE}_{it}) + \beta 4\ \text{Age}_{it} + \beta 5\ \text{Leverage}_{it} + \beta 5\ \text{Leverage}_{it} + \beta 6\ \text{Systematic Risk}_{it} + \beta 7\ \text{Year 1º E.}_{it} + \varepsilon_{it}$$

2.5. Results

Tables 2.4 and 2.5 provide basic descriptive statistics and Pearson correlation coefficients of the variables used in our models. Our results show that there is no high correlation between any of our variables, except for the intensity of green bond 1 and the intensity of green bond 2, with a value of 0.92. It is normal for these variables to have a high and positive correlation because both variables refer to the intensity of the green bond measured in different ways. It is worth mentioning that this correlation between the two does not produce multicollinearity problems since they are two independent variables from different models. Except for the correlation between these two variables, the highest value is 0.47. Additionally, we performed tests, using variance inflation factors (VIF), to ensure that there was no multicollinearity between our variables. In our study, the VIF values range from 1.00 to 2.27, with a mean of 1.45, suggesting that the correlation between variables did not generate relevant multicollinearity problems in our analysis (Hair et al., 1998).

Table 2.4. Mean, standard deviation, and Pearson correlation[a]

Variable	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11
1.Environmental Performance	8.14	15.78	-30.21	73.70											
2. Green Bonds	.50	.50	.00	1.00	.01										
3. Growth	50.23	123.98	-90.16	1330	.20*	-.02									
4. Financial Performance	-.08	6.58	-35.18	33.76	-.17*	.04	-.24								
5. Indebtedness	71.02	217.77	-99.91	2054	-.07	-.05	.27***	.08							
6. Age	32.67	23.72	1.00	148	-.01	.04	-.09	.01	-.11						
7. Leverage	.21	0.15	.00	.67	.13	-0.2	-.01†	.13†	-.13	-.01					
8. Systematic Risk	1.01	.46	.10	2.88	-.21†	.04	-.08	.08	-.17*	.06	-.14				
9. Year 1º E. 2013	.03	.16	.00	1.00	.02	.00	.01	.01	.05	-.08	-.09	.12			
10. Year 1º E. 2014	.16	.37	.00	1.00	-.07	.00	-.01	-.01	-0.07	.19*	.18*	-.11	-.07		
11. Year 1º E. 2016	.21	.41	.00	1.00	-.01	.00	.03	.04	.28***	-.13	-.03	-.04	-.08	-.23	
12. Year 1º E. 2017	.43	.50	.00	1.00	.25**	.00	-0.01	-.01	-0.16†	.11	-.11	-.08	-.14†	-.38	-.45

[a] N=160. Significance level †.10; *.05; **.01; ***.001.

Table 2.5. Mean, standard deviation, and Pearson correlation[a]

Variable	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9
1. Environmental Performance	8.32	16.79	-20.13	56.08									
2. Green Bond Intensity 1	1.30	2.39	.00	13.39	.20†								
3. Green Bond Intensity 2	4.88	7.91	.00	42.75	.22*	.92***							
4. Age	33.65	21.67	3	129	-.04	-.14	-.12						
5. Leverage	.21	.13	.01	-56	.15	.47***	.26*	-.04					
6. Systematic Risk	1.03	.44	.19	2.13	-.17	-.02	.09	.07	-.27*				
7. Year 1º E. 2013	.03	.16	.00	1.00	-.02	-.06	-.04	-.01	-.11	.10			
8. Year 1º E. 2014	.16	.37	.00	1.00	-.12	.14	.13	.41***	.12	-.10	-.07		
9. Year 1º E. 2016	.21	.41	.00	1.00	-.04	-.06	-.05	-.16	.09	-.06	-.08	-.23*	
10. Year 1º E. 2017	.43	.50	.00	1.00	.32**	-.16	-.15	-.06	-.12	-.09	-.14	-.38***	-.45***

[a] N=80. Significance level †.10; *.05; **.01; ***.001.

The results of Hypotheses 1, 3, 4a, and 4b are shown in Table 2.6. These four hypotheses have the same dependent variable (*improvement of environmental performance*) and the same independent variable (*issuance or non-issuance of green bonds*). Model 1 constitutes the reference model and includes the control variables; Model 2 includes the direct effect of corporate green bond issuance (H1); Model 3 includes the moderating effect of growth (H3); Model 4 includes the effects of financial performance (H4a); and Model 5 includes the effects of indebtedness (H4b).

Table 2.6. The effect of corporate green bonds on environmental performance[a]

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Control Variables	***b (SE)***	***b (SE)***	***b (SE)***	***b (SE)***	***b (SE)***
Age	-.02 (.06)	-.02 (.06)	-.01 (.05)	-.02 (.06)	-.02 (.06)
Leverage	15.28† (8.64)	15.30† (8.66)	11.37 (8.02)	12.12 (8.66)	13.38 (8.92)
Systematic Risk	-5.20† (2.82)	-5.23† (2.83)	-4.86* (2.45)	-6.86* (2.71)	-5.60† (2.82)
Year 1º E. 2013	12.77† (6.43)	12.77† (6.44)	15.60* (6.99)	12.60* (6.28)	15.32* (6.09)
Year 1º E. 2014	4.04 (3.36)	4.04 (3.37)	6.00† (3.06)	3.75 (3.07)	6.18† (3.31)
Year 1º E. 2016	7.28* (3.53)	7.28* (3.55)	6.88* (3.05)	6.35† (3.29)	8.28* (3.20)
Year 1º E. 2017	12.72***(3.44)	12.72*** (3.45)	13.68*** (3.19)	11.98*** (3.33)	15.03*** (3.26)
Green Bonds Direct Effect		**.69 (1.95)**	-3.12 (2.15)	-.48 (1.95)	-.06 (.36)
Growth			.01 (.01)		
Financial Performance				.16 (.12)	
Indebtedness					.01 (.01)
Moderating effects					
Green Bonds x Growth			**.08*** (.02)**		
Green Bonds x Financial Performance				**.94** (.32)**	
Green Bonds x Indebtedness					**.01* (.01)**
Constant	2.96 (4.73)	2.65 (4.79)	1.32 (4.59)	5.60 (4.82)	.77 (5.40)
Δ F (df)	3.37* (7)	0.12 (1)	14.76*** (1)[b]	8.77** (1)[b]	6.00* (1)[b]
F	3.37**	3.00**	5.22***	4.51***	4.73***
R-squared	.14	.15	.24	.20	.22

Notes: nonstandardized (*b*) and standard errors (*SE*).
[a] N=160. Significance level †.10; *.05; **.01; ***.001.
[b] Model 2 as reference.

The F statistic, which is a test that allows us to assess the explanatory capacity of a group of independent variables on the variation of the dependent variable, indicates that all the models shown are statistically significant. After each regression, we also calculated the increment of F using STATA's test command to check whether the inclusion of the new variable in the following model improves it. In this regard, we found that Models 3, 4, and 5 are significant and have no worse degree of significance than their reference model, whereas Model 2 is neither significant nor improves with respect to the previous model. Finally, the coefficient of determination (r-squared) improves for each model with respect to its reference model.

The results of Hypothesis 2, in which we analyze the influence of green bond intensity on environmental performance, are shown in Table 2.7. Model 1 shows the reference model and it includes the control variables. Models 2 and 3 include the direct effect of the bond intensity measured in terms of firm size (Model 2) and indebtedness (Model 3).

Table 2.7. The effect of corporate green bonds intensity on environmental performance[a]

	Model 1	**Model 2**	**Model 3**
Control Variables	***b (SE)***	***b (SE)***	***b (SE)***
Age	.01 (.09)	.04 (0.09)	.04 (.09)
Leverage	21.72 (14.34)	4.86 (15.83)	11.07 (14.33)
Systematic Risk	-2.93 (4.46)	-4.01 (4.36)	-4.95 (4.35)
Year 1º E. 2013	9.14 (12.24)	11.09 (11.93)	11.00 (11.76)
Year 1º E. 2014	2.68 (6.88)	1.95 (6.70)	1.30 (6.63)
Year 1º E. 2016	6.29 (5.93)	8.72 (5.87)	8.10 (5.73)
Year 1º E. 2017	14.62*** (5.30)	16.42** (5.22)	16.17** (5.12)
Intensity 1 Direct Effect		**1.99* (.88)**	
Intensity 2 Direct Effect			**.64** (.24)**
Constant	-1.31 (8.43)	-1.93 (8.20)	-2.53 (8.10)
Δ F (df)	2.00† (7)	5.08* (1)[b]	7.15** (1)[b]
F	2.00†	2.48*	2.79**
R-squared	0.16	0.22	0.24

Notes: nonstandardized (b) and standard errors (SE).
[a] N=80. Significance level †.10; *.05; **.01; ***.001.
[b] Model 1 as reference.

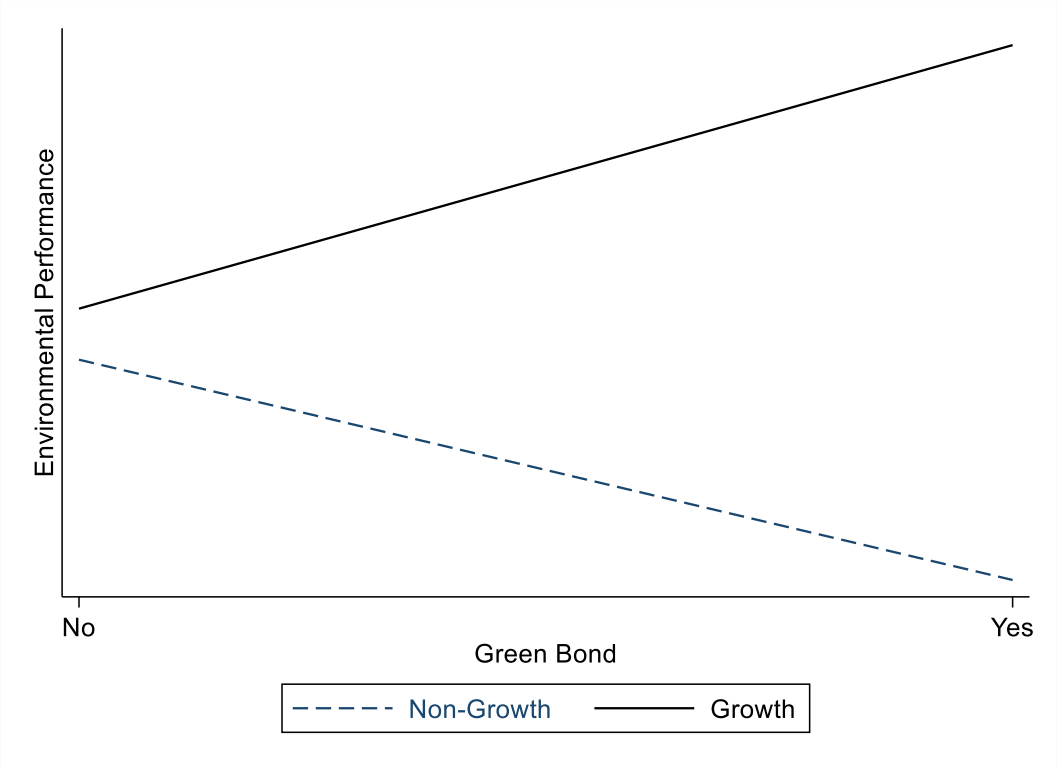
Hypothesis 1 predicted that the issuance of corporate green bonds leads to a positive effect on environmental improvement. Model 2 of Table 2.6 shows that the coefficient of the variable representing the issuance of corporate green bonds is not significant (*b = 0.69).* In addition, as mentioned, the inclusion of the variable representing the issuance of corporate green bonds does not improve the model nor is it significant ($F_{(1)} = 0.12$). Therefore, we disregard the direct effect of the issuance of corporate green bonds on improving issuing firms' environmental performance, thereby rejecting Hypothesis 1.

Hypothesis 2 predicted that the intensity of green bonds positively affects environmental improvement. Model 2 of Table 2.7 shows that the coefficient of the variable representing this direct effect is significant (*b = 1.99*)*. The F test on the improvement of the model confirms that the results of this direct effect are significant, improving the model (F(1) = *5.08**). The F statistic of the general significance of the model (*F = 2.48**) shows that the whole model is statistically significant. Model 3 of Table 2.7 also shows that the coefficient of the variable representing this direct effect is significant (*b = 0.64*)*. The F test on the improvement of the model confirms that the results of this direct effect are significant, improving the model (F(1) = *7.15***). The F statistic of the general significance of the model (*F = 2.79***) shows that the whole model is statistically significant. Therefore, for both models, we can argue that bond intensity positively affects the improvement of environmental performance. Thus, we have no evidence to reject Hypothesis 2.

Once the direct effect of improving environmental performance following the issuance of a green bond (H1) was disregarded, we analyzed the effectiveness of attention to produce changes in performance under certain internal firm conditions. Specifically, we sought to analyze Hypothesis 3 by determining whether the issuance of corporate green bonds renders the improvement of environmental performance more intense if firms are growing, and in Hypotheses 4a and 4b, whether the issuance of corporate green bonds renders the improvement of environmental performance more intense if firms are obtaining extra financial resources.

Model 3 in Table 2.6 shows significant moderating effects of firm growth on the correlation between corporate green bond issuance and environmental performance (*b = 0.08****). The F test of model improvement confirms that the effects of moderation are significant and do not worsen the model (F(*1*) = *14.76****), and the F statistic of the general significance of the model (*F = 5.22****) shows that the entire model is statistically significant. Figure 1 shows the results of moderation. Therefore, the issuance of corporate green bonds creates a positive effect on environmental improvement for growing firms, whereas the effect is negative for stagnant or shrinking firms. These results support Hypothesis 3.

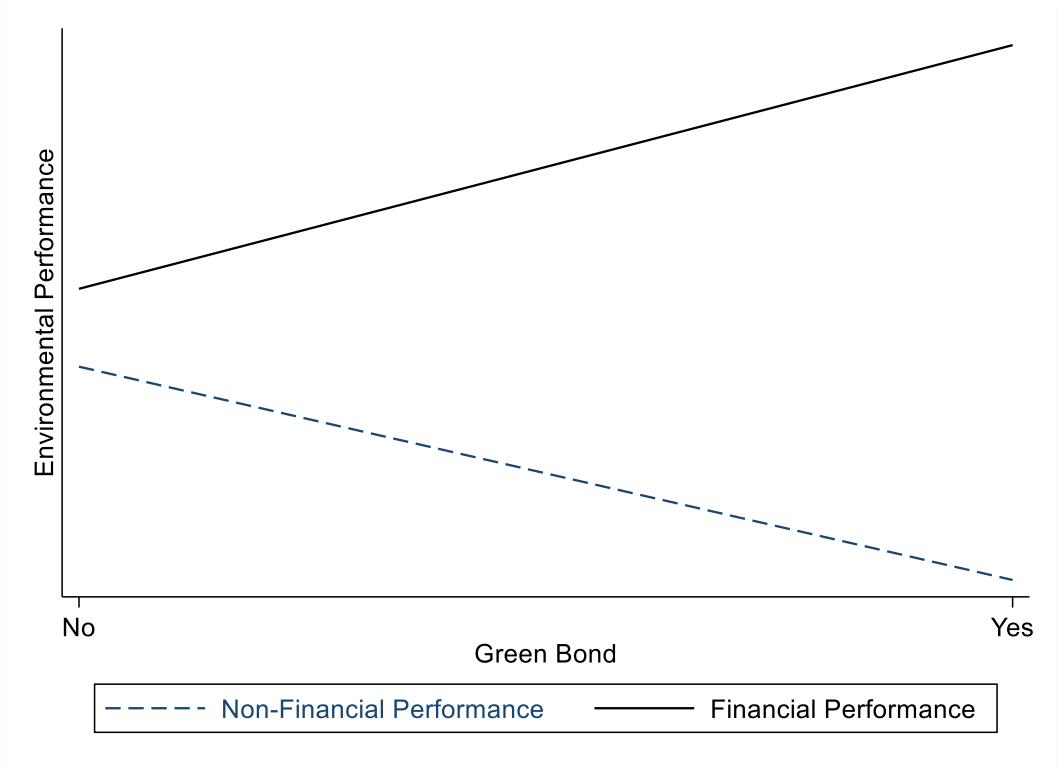
Figure 2.1. The moderating effect of growth on environmental performance following the issuance of green bonds



Source: Own elaboration

Model 4 in Table 2.6 shows significant moderating effects of firm financial performance on the correlation between corporate green bond issuance and environmental performance (*b = 0.94***). The F test of model improvement confirms that the effects of moderation are significant and do not worsen the model ($F(_1) = 8.77$**), and the F statistic of the general significance of the model *(F = 4.51****) shows that the entire model is statistically significant. Figure 2 shows the results of the moderation. Therefore, while the issuance of corporate green bonds creates a positive effect on environmental improvement for firms that are improving their financial performance, the effect is negative for those firms that have financial issues. These results support Hypothesis 4a.

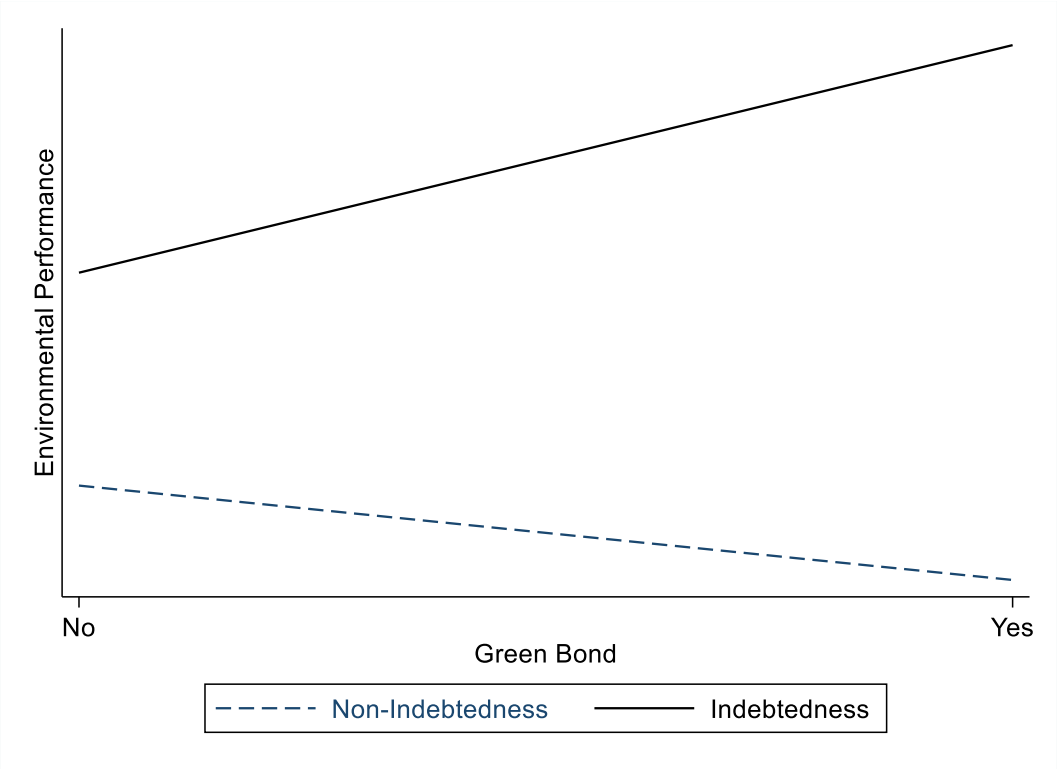
Figure 2.2. The moderating effect of financial performance on environmental performance following the issuance of green bonds



Source: Own elaboration

Model 5 in Table 2.6 shows significant moderating effects of corporate indebtedness on the correlation between corporate green bond issuance and environmental performance (*b = 0.01**). The F test of model improvement confirms that the effects of moderation are significant and do not worsen the model ($F(_1) = 6.00$*), and the F statistic of the general significance of the model (*F = 4.73***) shows that the entire model is statistically significant. Figure 3 shows the results of the moderation. Therefore, while the issuance of corporate green bonds creates a positive effect on environmental improvement for firms that increase their indebtedness, the effect is negative for those firms that do not increase their indebtedness. These results support Hypothesis 4b.

Figure 2.3. The moderating effect of indebtedness on environmental performance following the issuance of green bonds



Source: Own elaboration

Finally, we proceed to assess the robustness of our findings by changing the analysis period. Instead of examining the variation in environmental performance over a "long-term" five-year period, we analyze it over a more intermediate three-year period. Although environmental results typically materialize in the long term (Aragón-Correa, 1998; Aragón-Correa & Sharma, 2003), we believe it is relevant to conduct this analysis in an intermediate period to verify the solidity of our findings. Table 2.8 shows the comparison of our hypotheses between both periods, from which two conclusions can be drawn. The first is that the results in both periods are similar, except for Hypothesis 4a, providing us with confidence in the robustness of our findings. The second is that environmental results materialize over time, as the models show improvement over a five-year period compared to a three-year period.

Table 2.8. Robustness tests

	3 Years	**5 Years**
Hypothesis (H)	***b (SE)***	***b (SE)***
Green Bonds Direct Effect (H1)	.64 (1.73)	.69 (1.95)
Intensity 1 Direct Effect (H2)	1.58* (.72)	1.99* (.88)
Intensity 2 Direct Effect (H2)	.44* (.19)	.64** (.24)
Green Bonds x Growth (H3)	.08* (.03)	.08*** (.02)
Green Bonds x Financial Performance (H4a)	.17 (.25)	.94** (.32)
Green Bonds x Indebtedness (H4b)	.01* (.01)	.01* (.01)

Notes: nonstandardized (b) and standard errors (SE).
[a] Significance level †.10; *.05; **.01; ***.001.

2.6. Discussion

Amidst the growing stringency of laws and regulations, as well as the heightened expectations from investors and stakeholders, firms have recognized the imperative of incorporating environmental considerations into their strategic planning processes as a means to enhance their operational and financial performance (Liao, 2018; Tsai & Liao, 2017; Yang et al., 2020). In this context, corporate green bonds have emerged as an alternative financial instrument to support projects aimed at improving firms' environmental performance. Previous studies have demonstrated that these financial instruments can contribute to enhancing environmental performance of firms (Benlemlih et al., 2023; Flammer, 2021) and have highlighted that the extent of these improvements are not homogeneous for all firms (Fatica & Panzica, 2021). Our results also support this view. Despite the fact that the issuance of a green bond is instrumental in directing senior management's attention throughout the organization, not all scenarios of green bonds issuance show improvements in environmental performance.

Though previous studies have found that corporate green bonds have a positive impact on environmental performance (Benlemlih et al., 2023; Flammer, 2021), our results show that these improvements are not uniform across all firms, in line with Fatica and Panzica (2021). Contrastingly, the issuance of green bonds itself in general contexts may not be

sufficient to improve environmental performance. One possible explanation for the lack of a direct correlation between issuing corporate green bonds and environmental performance improvement may be the initial environmental performance level prior to issuing the green bond. In our analysis, we found that firms that issuing green bonds already exhibit a higher environmental performance score (67.94 points) compared to firms that do not issue this type of bond (60.38 points). Though achieving initial advancements in environmental performance may be relatively easier, further improvements often necessitate significant structural changes within the firm, which can be more challenging to accomplish. A second reason for the varied impact of corporate green bond issuance on environmental performance is that the bonds alone may not be sufficient to effectively disseminate attention to environmental issues throughout the entire organization.

To gain a deeper understanding of conditions under which attention positively influences firms' environmental performance, we analyzed various factors. Our findings reveal that bond intensity plays a crucial role in enhancing the environmental performance of firms when issuing green bonds. One plausible explanation for this finding aligns with the ABV framework, suggesting that higher bond intensity leads to increased attention from managers towards environmental issues within the firm's strategic planning. Further, we examine the moderating effect of growth on the relationship between issuing corporate green bonds and the environmental performance improvement. Our results indicate that the issuance of corporate green bonds has a positive effect on environmental performance for firms that are growing, whereas the effect becomes negative for firms in a stage of degrowth. One possible explanation for the negative effect in the degrowth context is that managers may use issuing a corporate green bond as a signal, which only seeks to improve the environmental reputation of the firm, rather than a genuine commitment to enhancing the environmental performance. In such cases, the issuance of green bond may be considered a form of greenwashing, as environmental initiatives can sometimes be perceived as greenwashing (Berrone et al., 2017). Additionally, our results demonstrate that the improvement in environmental performance can be enhanced by accessing additional financial resources either internally or externally. Specifically, we analyze the moderating effect of the availability of additional internal resources (i.e. higher financial

performance) and subsequently analyze the moderating effect of external financing (indebtedness).

First, our findings indicate that firms improving their financial performance can greatly enhance their environmental performance through the issuance of green bonds. This is the case in which we observe the maximum environmental improvement. However, for firms that are facing financial difficulties, issuing green bonds does not lead to environmental performance improvement; it can worsen it. This pattern emerges because firms grappling with financial challenges tend to prioritize economic and short-term considerations, diverting their attention away from environmental objectives. These results align with previous studies, which highlight the difficulties faced by financially struggling firms in pursuing high levels of environmental performance. Achieving such performance requires substantial financial resources (Berrone & Gómez-Mejía, 2009) and long-term rewards (Aragón-Correa, 1998; Aragón-Correa & Sharma, 2003). Therefore, firms facing financial difficulties may prioritize conservative initiatives that primarily focus on reputation enhancement and short-term financial benefits (De Villiers et al., 2011). One plausible explanation for this finding is that firms in these scenarios are grappling with pressing business challenges and need to prioritize more immediate issues in the short term. Consequently, attention and resources could be directed towards these critical concerns, resulting in a limited focus on environmental improvements.

Second, our analysis shows that for those firms that are increasing their external financing, observe an improvement in their environmental performance through the issuance of green bonds. However, for firms that are facing financial difficulties, issuing green bonds does not lead to environmental performance improvement; it can worsen it. The use of green bonds along with obtaining additional resources is necessary to enhance environmental performance, as it captures the attention of firm managers on environmental issues by providing them with greater financial resources to invest in improving environmental performance. This suggests that additional financial resources, such as indebtedness, play a crucial role as a driver of environmental practices, as the lack of this financial motivation on the part of executives may lead them to divert their attention to other firm issues that require fewer financial resources.

2.7. Conclusions, limitations, and future research

Our study explores the impact of green bond issuance on firms' environmental performance under certain internal contexts and introduces the ABV theory as a framework. To conduct the study, we use a matched sample of 160 firms with data between 2013 and 2022. The matching methodology is more efficient than independently selected samples because it allows us to compare performance between similar groups of firms. Our study makes two significant contributions. First, building upon previous research on sustainable finance and environmental performance (Benlemlih et al., 2023; Fatica & Panzica, 2021; Flammer, 2021), we extend these findings by demonstrating the heterogeneity in the effects of issuing green bonds on the environmental performance of firms. By incorporating the ABV theory as a theoretical framework, we provide insights into how the issuance of corporate green bonds can influence managers' attention towards environmental strategies and initiatives within the firm. To enhance the environmental performance of a firm, it is crucial for all managers to share a common vision and commitment to implementing environmental strategies. Our study underscores the importance of this alignment, as it directly contributes to improving the firm's environmental performance. By illuminating the role of attention in the context of corporate green bonds, we contribute to the literature on sustainable finance and deepen our understanding of the mechanisms that drive environmental performance improvements.

Senior managers can effectively signal their commitment to environmental issues to by issuing a corporate green bond, which increases the attention and focus of the entire management team on these crucial matters. In our study, we contribute to the ABV literature by showing that the issuance of green bonds alone may not be sufficient to disseminate this attention throughout the entire organization. Rather, the relative size of the green bond affects their capability to translate attention from the senior managers to the entire organization allowing environmental performance improvements within the firm. Furthermore, we shed light on the importance of certain causal mechanisms that bridge and act, ultimately driving greater improvements. Our analysis highlights the significance of internal conditions, such as growth, profitability, and indebtedness, in influencing the potential impact of issuing a corporate green bond on their environmental

performance. By exploring the attention-behaviors-performance link, our study contributes to a deeper understanding of the complex dynamics involved in achieving environmental performance improvements and underscores the importance of considering internal conditions as influential factors.

We must acknowledge four limitations in our study. First, while financial data providers generally adhere to similar criteria for determining whether a bond is classified as green, the lack of standardized definitions and regulations across all providers introduces slight variations in the classification process. This variability can result in different ratings assigned to green bonds by different analysts. Future studies could consider incorporating data from multiple financial data providers to analyze common emissions data and average scores across databases, promoting greater consistency.

Second, we rely on Refinitiv's environmental performance scores to operationalize environmental performance. Recent evidence suggests these ratings may be upward-biased for firms that disclose more extensively and for those with greater size-related reporting resources. Christensen, et al. (2022) show that more extensive ESG disclosure tends to increase rather than reduce disagreement among rating agencies, suggesting that part of the score reflects the volume of narrative reporting rather than actual environmental outcomes. Drempetic, et al., (2020) document a systematic positive association between firm size and Refinitiv ESG scores, raising the possibility that larger issuers obtain higher ratings because they can devote more resources to reporting rather than because they pollute less. These two sources of bias—rating inflation and size—could overstate the improvements we attribute to green bond issuance, so the coefficients reported here should be interpreted with caution.

Third, our results regarding the first hypothesis may be influenced by the mean duration of the green bond (8.3 years) and the specific period analyzed (first five years). It is possible that the funds raised through bond issuance, though intended for improving environmental performance, have not yet yielded noteworthy results within the analyzed timeframe. Although we have included the longest period possible when this work was conducted, which avoided measuring improvement in a single year, future research could replicate the analyses using longer periods to capture more comprehensive outcomes.

Last, our study primarily focused on internal aspects of firms. To gain a more comprehensive understanding of the effects of green bonds on environmental performance, future research should explore the impact of institutional factors and external aspects within the broader context. This would provide a more holistic perspective and a complete picture of the implications of green bonds for firms' environmental performance. In summary, the increasing societal pressure for firms to have a positive impact has led to the proliferation of sustainable instruments, including social bonds, sustainable bonds, and sustainability-related bonds. As we move forward, it becomes essential for future research to delve into how firms are navigating these new sustainable instruments and their implications. One area of exploration could involve analyzing the impact of social bonds not only on social performance but also on the overall Environmental, Social, and Governance performance of a firm. This research would provide valuable insights into how firms can effectively utilize these instruments to achieve comprehensive sustainability goals.

Our findings have important policy implications, given global efforts to scale up sustainable finance and environmental improvement. Policymakers can use these findings to adapt regulatory frameworks for green finance, recognizing the variable impact of green bond issuance by firms depending on certain domestic conditions. The promotion of green bonds may be most effective for financially sound and growing firms, highlighting the need for differentiated approaches. Practitioners should be aware of the limitations of green bonds as stand-alone tools to achieve comprehensive environmental improvements, emphasizing the importance of integrating them into broader sustainability strategies aligned with specific internal contexts. Researchers can build on our work by studying longer-term effects and other contextual factors that influence the relationship between attention, behaviors, and performance. Our study lays the foundation for future research on optimizing environmental strategies in conjunction with sustainable financial instruments and specific contextual factors, thereby contributing to the evolving field of sustainable finance and guiding environmentally responsible business practices.

References

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. (2016). Sustainability-oriented innovation: A systematic review. *International Journal of Management Reviews, 18*(2), 180-205.

Aguilera-Caracuel, J., & Ortiz-de-Mandojana, N. (2013). Green innovation and financial performance: An institutional approach. *Organization & Environment, 26*(4), 365-385.

Aguilera, R. V., Aragón-Correa, J. A., Marano, V., & Tashman, P. A. (2021). The corporate governance of environmental sustainability: A review and proposal for more integrated research. *Journal of Management, 47*(6), 1468-1497.

Albort-Morant, G., Leal-Rodríguez, A. L., & De Marchi, V. (2018). Absorptive capacity and relationship learning mechanisms as complementary drivers of green innovation performance. *Journal of Knowledge Management, 22*(2), 432-452.

Alt, E., Díez-de-Castro, E. P., & Lloréns-Montes, F. J. (2015). Linking employee stakeholders to environmental performance: The role of proactive environmental strategies and shared vision. *Journal of Business Ethics, 128*, 167-181.

Alt, E., & Spitzeck, H. (2016). Improving environmental performance through unit-level organizational citizenship behaviors for the environment: A capability perspective. *Journal of Environmental Management, 182*, 48-58.

Andersén, J. (2022). An Attention-Based View on Environmental Management: The Influence of Entrepreneurial Orientation, Environmental Sustainability Orientation, and Competitive Intensity on Green Product Innovation in Swedish Small Manufacturing Firms. *Organization & Environment, 35*(4), 627-652.

Angell, L. C., & Klassen, R. D. (1999). Integrating environmental issues into the mainstream: an agenda for research in operations management. *Journal of Operations Management, 17*(5), 575-598.

Aragón-Correa, J. A. (1998). Strategic proactivity and firm approach to the natural environment. *Academy of Management Journal, 41*(5), 556-567.

Aragón-Correa, J. A., & Rubio-Lopez, E. A. (2007). Proactive corporate environmental strategies: myths and misunderstandings. *Long range planning, 40*(3), 357-381.

Aragón-Correa, J. A., & Sharma, S. (2003). A contingent resource-based view of proactive corporate environmental strategy. *Academy of Management Review, 28*(1), 71-88.

Balakrishnan, S., & Fox, I. (1993). Asset specificity, firm heterogeneity and capital structure. *Strategic Management Journal, 14*(1), 3-16.

Barnett, M. L. (2005). Paying attention to real options. *R&D Management, 35*(1), 61-72.

Barua, S., & Chiesa, M. (2019). Sustainable financing practices through green bonds: What affects the funding size? *Business Strategy and the Environment, 28*(6), 1131-1147.

Benlemlih, M., Jaballah, J., & Kermiche, L. (2023). Does financing strategy accelerate corporate energy transition? Evidence from green bonds. *Business Strategy and the Environment, 32*(1), 878-889.

Berrone, P., Fosfuri, A., & Gelabert, L. (2017). Does greenwashing pay off? Understanding the relationship between environmental actions and environmental legitimacy. *Journal of Business Ethics, 144*, 363-379.

Berrone, P., & Gomez-Mejia, L. R. (2009). Environmental performance and executive compensation: An integrated agency-institutional perspective. *Academy of Management Journal, 52*(1), 103-126.

Bhandari, K. R., Rana, S., Paul, J., & Salo, J. (2020). Relative exploration and firm performance: Why resource-theory alone is not sufficient? *Journal of Business Research, 118*, 363-377.

Chen, Y. S., Lai, S. B., & Wen, C. T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business Ethics, 67*, 331-339.

Cheng, L. T., Sharma, P., & Broadstock, D. C. (2023). Interactive effects of brand reputation and ESG on green bond issues: A sustainable development perspective. *Business Strategy and the Environment, 32*(1), 570-586.

Cheong, C., & Choi, J. (2020). Green bonds: a survey. *Journal of Derivatives and Quantitative Studies: Seonmul Yeon'gu, 28*(4), 175-189.

Cho, T. S., & Hambrick, D. C. (2006). Attention as the mediator between top management team characteristics and strategic change: The case of airline deregulation. *Organization Science, 17*(4), 453-469.

Cochran, W. G. (1953). Matching in analytical studies. *American Journal of Public Health and the Nations Health, 43*(6_Pt_1), 684-691.

Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Aministrative Science Quarterly, 17*, 1-25.

Cormier, D., & Magnan, M. (2004). The impact of the web on information and communication modes: the case of corporate environmental disclosure. *International Journal of Technology Management, 27*(4), 393-416.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75-87.

Christensen, D. M., Serafeim, G., & Sikochi, A. (2022). Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review, 97*(1), 147-175.

Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Prentice Hall/Pearson Education.

Dangelico, R. M., & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. *Journal of Business Ethics, 95*, 471-486.

De Villiers, C., Naiker, V., & Van Staden, C. J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management, 37*(6), 1636-1663.

Dorfleitner, G., Utz, S., & Zhang, R. (2022). The pricing of green bonds: external reviews and the shades of green. *Review of Managerial Science, 16*, 797-834.

Dost, M., Pahi, M. H., Magsi, H. B., & Umrani, W. A. (2019). Influence of the best practices of environmental management on green product development. *Journal of Environmental Management, 241*, 219-225.

Drempetic, S., Klein, C., & Zwergel, B. (2020). The influence of firm size on the ESG score: Corporate sustainability ratings under review. *Journal of business ethics, 167*(2), 333-360.

Dutton, J. E., & Ashford, S. J. (1993). Selling issues to top management. *Academy of Management Review, 18*(3), 397-428.

Eklund, J. C., & Mannor, M. J. (2021). Keep your eye on the ball or on the field? Exploring the performance implications of executive strategic attention. *Academy of Management Journal, 64*(6), 1685-1713.

Environmental Finance (2023). *Database Environmental Finance*. Available at: https://surl.li/trogva (accessed 25 March 2023).

Ferrier, W. J., Smith, K. G., & Grimm, C. M. (1999). The role of competitive action in market share erosion and industry dethronement: A study of industry leaders and challengers. *Academy of Management Journal, 42*(4), 372-388.

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment, 30*(5), 2688-2701.

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics, 142*(2), 499-516.

Flammer, C., Toffel, M. W., & Viswanathan, K. (2021). Shareholder activism and firms' voluntary disclosure of climate change risks. *Strategic Management Journal, 42*(10), 1850-1879.

Friedland, R. (1991). Bringing society back in: Symbols, practices, and institutional contradictions. *The New Institutionalism in Organizational Analysis*, 232-263.

Ha, Y. J. (2021). Attention green aliens? Activities of multinational enterprises in host countries and eco-innovation diffusion. *Journal of Business Research, 123*, 32-43.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193-206.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis*. Prentice Hall.

Huang, J. W., & Li, Y. H. (2017). Green innovation and performance: The view of organizational capability and social reciprocity. *Journal of Business Ethics, 145*, 309-324.

ICMA (2018). *Green Bond Principles. Voluntary process guidelines for issuing green bonds 2018*. https://surl.li/siqtog (accessed 10 June 2022).

ICMA (2020a). *Green, social and sustainability bonds: A high-level mapping to the sustainable development goals 2020*. Available at: https://surl.li/ookgcf (accessed 18 September 2022).

ICMA (2020b). *Sustainability-linked bonds principles. Voluntary process guidelines 2020*. Available at: https://surl.li/aajdgq (accessed 18 September 2022).

Jia, Q. (2023). The impact of green finance on the level of decarbonization of the economies: An analysis of the United States', China's, and Russia's current agenda. *Business Strategy and the Environment, 32*(1), 110-119.

Kassinis, G., & Vafeas, N. (2002). Corporate boards and outside stakeholders as determinants of environmental litigation. *Strategic Management Journal, 23*(5), 399-415.

Larcker, D. F., & Watts, E. M. (2020). Where's the greenium? *Journal of Accounting and Economics, 69*(2-3), 101312.

Liao, Z. (2018). Market orientation and FIRMS'environmental innovation: The moderating role of environmental attitude. *Business Strategy and the Environment, 27*(1), 117-127.

Liao, Z., Lu, J., Yu, Y., & Zhang, Z. (2022). Can attention allocation affect firm's environmental innovation: the moderating role of past performance. *Technology Analysis & Strategic Management, 34*(9), 1081-1094.

Mallette, P. (1991). Antitakeover charter amendments: Impact on determinants of future competitive position. *Journal of Management, 17*(4), 769-786.

March, J. G., & Simon, H. A. (1958). *Organizations*. New York: Wiley, 262.

March, J. G., & Olsen, J. P. (1976). *Ambiguity and choice in organizations*. Bergen: Universitetsforlaget.

McKinlay, S. M. (1977). Pair matching: A reappraisal of a popular technique. *Biometrics, 33*(4), 725-735.

Mohan-Neill, S. I. (1995). The influence of firm's age and size on its environmental scanning activities. *Journal of Small Business Management, 33*(4), 10-21.

Murphy, G. B., Trailer, J. W., & Hill, R. C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research, 36*(1), 15-23.

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal, 18*(S1), 187-206.

Ocasio W., & Joseph J. (2005). An attention-based theory of strategy formulation: Linking micro-and macroperspectives in strategy processes. *Advances in Strategic Management, 22*, 39–61.

Ocasio, W. (2011). Attention to attention. *Organization Science, 22*(5), 1286-1296.

Ocasio, W., & Joseph, J. (2018). The attention-based view of great strategies. *Strategy Science, 3*(1), 289-294.

Oliver, C. (1997). Sustainable competitive advantage: combining institutional and resource-based views. *Strategic Management Journal, 18*(9), 697-713.

Ortiz-de-Mandojana, N., & Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal, 37*(8), 1615-1631.

Pfeffer, J., & Salancik, G. R. (2003). *The external control of organizations: A resource dependence perspective*. Stanford University Press.

Potrich, L., Cortimiglia, M. N., & de Medeiros, J. F. (2019). A systematic literature review on firm-level proactive environmental management. *Journal of Environmental Management, 243*, 273-286.

Refinitiv Eikon (2022). *Database Refinitiv* (accessed 31 December 2022).

Rennings, K. (2000). Redefining innovation—eco-innovation research and the contribution from ecological economics. *Ecological Economics, 32*(2), 319-332.

Roberts, R. W. (1992). Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Accounting, Organizations and Society, 17*(6), 595-612.

Rubin, D. B. (1973). The use of matched sampling and regression adjustment to remove bias in observational studies. *Biometrics*, *29*(1), 185-203.

Rueda-Manzanares, A., Aragón-Correa, J. A., & Sharma, S. (2008). The influence of stakeholders on the environmental strategy of service firms: The moderating

effects of complexity, uncertainty and munificence. *British Journal of Management, 19*(2), 185-203.

Ridge, J. W., Johnson, S., Hill, A. D., & Bolton, J. (2017). The role of top management team attention in new product introductions. *Journal of Business Research, 70*, 17-24.

Russo, A., Mariani, M., & Caragnano, A. (2021). Exploring the determinants of green bond issuance: Going beyond the long-lasting debate on performance consequences. *Business Strategy and the Environment, 30*(1), 38-59.

Sharma, S., & Henriques, I. (2005). Stakeholder influences on sustainability practices in the Canadian forest products industry. *Strategic Management Journal, 26*(2), 159-180.

Sharma, S., & Vredenburg, H. (1998). Proactive corporate environmental strategy and the development of competitively valuable organizational capabilities. *Strategic Management Journal, 19*(8), 729-753.

Shepherd, D. A., Mcmullen, J. S., & Ocasio, W. (2017). Is that an opportunity? An attention model of top managers' opportunity beliefs for strategic action. *Strategic Management Journal, 38*(3), 626-644.

Short, J. L., & Toffel, M. W. (2010). Making self-regulation more than merely symbolic: The critical role of the legal environment. *Administrative Science Quarterly, 55*(3), 361-396.

Simon, H. A. (1947). *Administrative behavior*. New York: Free Press.

Siren, C., Parida, V., Frishammar, J., & Wincent, J. (2020). Time and time-based organizing of innovation: Influence of temporality on entrepreneurial firms' performance. *Journal of Business Research, 112,* 23-32.

Symeou, P. C., Zyglidopoulos, S., & Gardberg, N. A. (2019). Corporate environmental performance: Revisiting the role of organizational slack. *Journal of Business Research, 96*, 169-182.

Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance, 61*, 101427.

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319-1350.

Tolliver, C., Keeley, A. R., & Managi, S. (2020). Drivers of green bond market growth: The importance of Nationally Determined Contributions to the Paris Agreement and implications for sustainability. *Journal of Cleaner Production, 244*, 118643.

Tsai, K. H., & Liao, Y. C. (2017). Sustainability strategy and eco-innovation: A moderation model. *Business Strategy and the Environment, 26*(4), 426-437.

Tuggle, C. S., Sirmon, D. G., Reutzel, C. R., & Bierman, L. (2010). Commanding board of director attention: investigating how organizational performance and CEO duality affect board members' attention to monitoring. *Strategic Management Journal, 31*(9), 946-968.

Wagner, M. (2015). The link of environmental and economic performance: Drivers and limitations of sustainability integration. *Journal of Business Research, 68*(6), 1306-1317.

Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: Is there really a link?. *Strategic Management Journal, 33*(8), 885-913.

Walls, J. L., & Berrone, P. (2017). The power of one to make a difference: How informal and formal CEO power affect environmental sustainability. *Journal of Business Ethics, 145*, 293-308.

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews, 9*(1), 31-51.

Wang, R., Wijen, F., & Heugens, P. P. (2018). Government's green grip: Multifaceted state influence on corporate environmental actions in China. *Strategic Management Journal, 39*(2), 403-428.

Yadav, M. S., Prabhu, J. C., & Chandy, R. K. (2007). Managing the future: CEO attention and innovation outcomes. *Journal of Marketing, 71*(4), 84-101.

Yang, Q., Geng, R., & Feng, T. (2020). Does the configuration of macro-and micro-institutional environments affect the effectiveness of green supply chain integration? *Business Strategy and the Environment, 29*(4), 1695-1713.

Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance, 98*, 39-60.

CAPÍTULO 3:

SUSTAINABILITY SIGNALS: THE EFFECT OF ESG BONDS ON REPUTATIONAL IMPROVEMENTS

3.1. Introduction

Environmental, social, and governance (ESG) bonds, also known as sustainable bonds, are financial assets that firms use to support sustainable projects and activities. Their adoption has grown exponentially in recent years, from USD 25 billion issued in 2014 to USD 850 billion issued in 2023 (Environmental Finance, 2024). This growth has been driven by the increasing focus on sustainability among stakeholders, governments, and society at large (Hart & Dowell, 2011; Norheim-Hansen, 2015). These instruments function in a way similar to conventional bonds but differ in their alignment with ESG-related purposes (Reboredo, 2018). ESG bonds integrate ESG factors as well as economic considerations into investment decisions (Bakken, 2021; ICMA, 2020c), thereby offering a structured framework for investors to align their portfolios with specific ESG objectives and acting as tangible tools for operationalizing those strategies (Yucel et al., 2023). Different types of ESG bonds exist—green bonds, which are the most prominent, finance projects with environmental benefits (Flammer, 2021); social bonds address social challenges (Ben Slimane et al., 2023); sustainability bonds fund initiatives that target both environmental and social objectives (Mathew & Sivaprasad, 2024); and sustainability-linked bonds are tied to the achievement or improvement of specific ESG metrics (ICMA, 2020b). The increasing use of ESG bonds has led researchers to explore whether firms leverage them to achieve higher market premiums or enhance sustainability performance. However, those studies often find mixed, negligible, or no effects (Fatica & Panzica, 2021; Flammer, 2021; Ordonez-Borrallo et al., 2024; Tang & Zhang, 2020).

Previous studies have linked sustainability initiatives, such as proactive environmental strategies (Nguyen & Adomako, 2021), eco-certifications (Fanasch, 2019), and environmental disclosure (Toms, 2002), to reputational outcomes. In line with this perspective, some studies suggest the potential signaling effect of ESG bonds, as they can communicate a commitment to sustainable development (Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020). However, the impact of ESG bonds on reputation outcomes remains unclear. While ESG bonds involve direct, quantifiable financial commitments to sustainable projects, they risk being perceived as mere opportunistic tactics if not accompanied by substantial environmental and social

actions. Moreover, their influence on reputation may unfold more gradually compared to other sustainability initiatives characterized by more immediate and visible effects.

In line with signaling theory (Ross, 1977; Spence, 1973), which explains how signals can reduce uncertainty and mitigate information asymmetries (Bergh et al., 2014), ESG bonds can function as a signaling mechanism for various stakeholders. They may, for instance, enhance corporate reputation or reduce reputational risk. Corporate reputation is defined as a perceptual representation of a firm's past actions and future prospects that describes the overall attractiveness of the firm to its stakeholders relative to other prominent rivals (Fombrun, 1996). Reputational risk is defined as the potential loss of that corporate reputation, which may affect investors' assessments (Hasan et al., 2022). Although both concepts are intrinsically connected, there are important differences between them. Corporate reputation is more connected to an extended group of stakeholders and can lead to multiple effects, such as increased sales, talent attraction, customer loyalty, and favorable negotiation conditions (Love & Kraatz, 2009; Roberts & Dowling, 2002). Reputational risk is more closely related to financial stakeholders, such as shareholders, and can entail such consequences as increases in financing costs, the loss of investors, or a decrease in stock value (Aula et al., 2016; Hasan et al., 2022). As a result of these differences, the two concepts are not always correlated, and scenarios in which a highly positive reputation is associated with low reputational risk, and vice versa, are common (Fortune, 2024; RepRisk, 2024).

In light of the limited exploration of the relationship between ESG bonds and reputational improvements, our objective is twofold. First, we distinguish between corporate reputation enhancement and reputation risk mitigation to assess whether the issuance of ESG bonds acts as a signal that strengthens corporate reputation and/or reduces reputational risk. Signaling theory suggests that issuers (i.e., firms) send signals that must be observable and costly (Connelly et al., 2011; Gomulya et al., 2019) if recipients (i.e., shareholders and other stakeholders) are to positively interpret them. In the case of ESG bonds, clear labeling and the specific purpose of each instrument reinforce their observable nature, while issuance costs, financial commitments, and associated compliance requirements reflect their costly nature for the issuing firm.

Second, we separate the audiences that receive signals from the issuance of ESG bonds into shareholders and other stakeholders. We analyze how each group interprets the signal in certain contexts and, consequently, the signal's effect on the improvement of corporate reputation (for other stakeholders) and the mitigation of reputational risk (for shareholders). We base this approach on extant literature indicating that the same signal can be interpreted differently depending on the audience (DesJardine et al., 2021; Park & Patel, 2015). Moreover, the intensity of the effects of ESG bonds depends on several factors, such as the novelty of the projects, the types of external audits, the intensity of green bonds, and the internal characteristics of the issuing firms (Fatica & Panzica, 2021; Ordonez-Borrallo et al., 2024).

We analyze two contexts: prior sustainability performance and debt cost. First, other stakeholders perceive firms that are leaders in terms of sustainability as emitting more credible signals than lagging firms because the former face higher penalty costs and these stakeholders assume that they would not engage in greenwashing. This situation leads to an improvement in these firms' corporate reputation. However, shareholders believe that the firms lagging behind have greater potential for improvement with more immediate impacts. Consequently, the mitigation of reputational risk should be more intense. Second, other stakeholders interpret higher borrowing costs as an opportunity, as they are a particularly strong signal of the firm's solidity and its commitment to sustainability, which improves corporate reputation. In contrast, shareholders interpret this situation as a threat, as it implies a higher risk of default. For them, reputational risk is better mitigated when debt costs are low.

To address our research questions, we collected data on corporate reputation from Fortune's *World's Most Admired Companies* ranking from 2017 through 2023 (Roberts & Dowling, 2002; Stanwick & Stanwick, 2011) and data on reputational risk from RepRisk (Huang et al., 2022; Li et al., 2017). We obtained details on ESG bonds and other data from the Refinitiv Eikon database. The final dataset included annual panel data on 500 firms and 3,500 observations. Using a fixed effects model with robust standard errors, we find that ESG bonds signal reputational improvements (i.e., enhanced corporate reputation and reputational risk mitigation). However, in certain contexts (i.e., high prior sustainability performance and high debt costs), we cannot confirm our results, as stakeholders have different interpretations. Specifically, prior sustainability leaders

improve their corporate reputation and mitigate their reputational risk by issuing ESG bonds, while laggards worsen their corporate reputation and increase their reputational risk. In terms of the cost of debt, firms with higher costs of debt improve their corporate reputation more by issuing ESG bonds than firms with lower costs of debt, with no significant results in terms of reputational risk.

This study contributes to the sustainable finance literature and signaling theory. With respect to the former, our paper helps improve our understanding of the benefits of issuing ESG bonds. Previous literature (Flammer, 2021; Larcker & Watts, 2020) shows that, in principle, ESG bonds are not economically profitable, as they involve higher costs for the issuing firm than conventional bonds, and those higher costs are not offset by an issuance premium. Furthermore, not all ESG bond issuances achieve their purpose of improving sustainability performance (Ordonez-Borrallo et al., 2024). Our study provides an alternative explanation for the issuance of these bonds, arguing that firms issue ESG bonds to improve their corporate reputations and/or mitigate reputational risk. While previous research has highlighted the reputational benefits of green bonds in facilitating collaborative innovation (Lian et al., 2023), we extend this perspective by examining ESG bonds as a deliberate signaling mechanism for reputational gains.

With regard to signaling theory, we expand the literature that addresses the fact that different audiences interpret the same signal differently (DesJardine et al., 2021; Park & Patel, 2015). Specifically, we separate shareholders from other stakeholders, and demonstrate that, under certain internal firm circumstances (e.g., certain debt costs), the interpretation of the signal received associated with the issuance of ESG bonds differs. Furthermore, our findings suggest that a prior leading position in sustainability or higher debt costs amplify the corporate reputation benefits in the eyes of other stakeholders.

3.2. Theoretical background

3.2.1 ESG bonds

Financial strategies, which have traditionally emphasized profitability, have undergone a significant paradigm shift, giving rise to the concept of sustainable finance. Sustainable finance represents a comprehensive financial approach that integrates ESG factors along with economic considerations into investment decision-making processes (Bakken, 2021;

ICMA, 2020c). ESG bonds serve as a tangible tool for operationalizing these strategies by providing a structured framework for investors to commit to specific ESG objectives. Within ESG bonds, a diverse range of products can be used, such as sustainability bonds, green mortgages, green loans, sustainable investment funds, green insurance products, and impact investing.

The most notable ESG bond products are green bonds, social bonds, sustainability bonds, and sustainability-linked bonds (Arévalo et al., 2024). Green bonds are designated for projects with environmental benefits; social bonds address social issues; sustainability bonds fund projects with both environmental and social objectives; and sustainability-linked bonds are tied to the achievement or improvement of specific ESG metrics (ICMA, 2020a, 2020b). Therefore, green, social, and sustainable bonds are characterized by their allocation of funds to projects with targeted, positive impacts (ICMA, 2020a), while sustainability-linked bonds aim to motivate issuers to meet predefined sustainability targets without imposing restrictions on how the funds are utilized (ICMA, 2020b). Thus, while the former bond types focus on financing particular projects, sustainability-linked bonds emphasize the issuer's overall sustainability performance and are linked to broader corporate goals.

The issuance of ESG bonds can bring some monetary benefits, such as direct subsidies for obtaining a green label or tax deductions. However, previous studies have found no yield differences between ESG bonds and conventional bonds (Ben Slimane et al., 2023; Flammer, 2021; Tang & Zhang, 2020). The market premium that investors pay for green bonds is usually negligible or insignificant (Flammer, 2021; Tang & Zhang, 2020), and no difference has been found between the yields of social bonds and conventional bonds (Ben Slimane et al., 2023). Moreover, the market price of sustainability-linked bonds depends on the expected probability of achieving the sustainability target and the amount of the penalty, which complicates the determination of the actual yield (Feldhütter et al., 2024).

The literature on corporate sustainability has also explored whether issuing ESG bonds improves a firm's sustainability performance. While the overall impact on the issuer's sustainability profile is generally positive (Benlemlih et al., 2023; Flammer, 2021; Makpotche et al., 2023), this is not true for all types of issuances (Fatica & Panzica, 2023;

Ordonez-Borrallo et al., 2024). For example, Fatica & Panzica (2021) found that CO2 emission reductions are more pronounced and enduring for new projects and emissions subject to external review and auditing, as well as those issued after the Paris Agreement. Similarly, Ordonez-Borrallo et al. (2024) found that not all corporate green bond issuances positively affect environmental performance, and highlighted the importance of both green bond intensity and firms' internal conditions, such as growth, profitability, and indebtedness.

Thus, previous studies have provided mixed empirical results regarding the relationship between ESG bonds and monetary benefits (Larcker & Watts, 2020; Lau et al., 2022; Zerbib, 2019) or improvements in the issuer's sustainability profile (Fatica & Panzica, 2023; Ordonez-Borrallo et al., 2024). Nevertheless, many firms are issuing ESG bonds to finance their sustainability initiatives. One plausible explanation is that firms may issue ESG bonds for non-monetary reasons (e.g., to enhance their reputations). Some studies suggest that green bonds can improve corporate reputation by strengthening collaborative innovation and stakeholder relationships (Lian et al., 2023), although the extent to which firms strategically use ESG bonds for reputational signaling remains unclear. This study uses signaling theory to examine whether reputational improvements occur following the issuance of ESG bonds, and distinguishes shareholders' interpretations of those bonds as mitigating reputational risk from other stakeholders' interpretations of those bonds as enhancing corporate reputation. Furthermore, as the effects of ESG bonds on firms depend on various factors (Fatica & Panzica, 2021; Ordonez-Borrallo et al., 2024), we analyze whether sustainability performance and debt costs reinforce or weaken these effects.

3.2.2 Signaling theory and ESG bonds

Since the publication of Spence's (1973) foundational work on signaling in labor markets and Ross's (1977) research on managerial incentives, signaling theory has become a well-known theoretical framework for understanding how signals can reduce uncertainty and mitigate information asymmetries between parties (Connelly et al., 2011; Gomulya et al., 2019; Park & Patel, 2015; Spence, 2002; Wu & Reuer, 2021). Information asymmetries may disguise the true characteristics, intentions, and behaviors of one party in relation to the others, leading to potential misjudgments. In response, one party (the issuer) can use

signals to convey specific attributes that the other party (the receiver) can verify, thus reducing the risk of making decisions based on incomplete or misleading information (Connelly et al., 2011). As suggested in previous studies, ESG bonds can convey credible and trustful signals about firms, thereby alleviating information asymmetries (Flammer, 2021; Tang & Zang, 2020).

Signaling theory involves three core components: the signal issuer, the signal itself, and the signal receiver. Signal issuers send signals to convey their latent attributes to potential receivers, with the aim of distinguishing themselves from peers and being perceived as higher quality (Gomulya et., 2019; Park & Patel, 2015).

The signal is the message or information transmitted by the signal issuer to the signal receivers. For a signal to effectively create a separating equilibrium, it must involve production costs, such as monetary or non-monetary costs (e.g., time), that are difficult for lower-quality issuers to replicate (Park & Patel, 2015). Production costs are the resources and expenses associated with creating and broadcasting the signal (Bergh et al., 2014). In addition, signals may have penalty costs, which arise when intended audiences perceive a signal as false and, subsequently, penalize the firm (DesJardine et al., 2021). Finally, the signal must also be easily observable by the receiver.

Signal receivers are external to the firm and lack detailed information about the firm but are interested in receiving it (Schepker et al., 2018). For signaling to be effective, the signal must lead to a strategic benefit for the issuer based on the receiver's interpretation, such as an investment in the firm or the purchase of its products. A crucial aspect of signaling theory is that both the issuer and the receiver should benefit from the information conveyed through the signal (Connelly et al., 2011). This mutual benefit enhances the credibility and impact of signals, resulting in outcomes like improved market value and competitive advantage for the firm (Fombrun & Shanley, 1990; Madhavan & Prescott, 1995).

Previous studies have identified different signal receivers, including shareholders (Wu & Reuer, 2021), debt holders (Elliott et al., 2009), customers (Mollenkopf et al., 2022), and competitors (Schepker et al., 2018). As there are different receivers, the same signal can be interpreted in various ways. According to Park & Patel (2015), signal receivers can

interpret the information from the signal differently due to firm and environmental factors that determine the trustworthiness of ambiguous signals. Furthermore, a signal can be misinterpreted by unintended audiences, leading to a negative interpretation (Desjardine et al., 2021). This study explores how the same signal can have multiple objectives and different interpretations depending on the audiences receiving it, as they have different interests.

3.2.3 Corporate reputation and reputational risk

Corporate reputation and reputational risk are closely related yet distinct concepts. Corporate reputation refers to the desired and necessary perception that a firm aims to project externally. One of the firm's most valuable intangible assets is a shared and socially constructed favorable impression of its activities and products (Rindova et al., 2005). This favorable impression significantly contributes to a firm's success by forming the basis for stakeholders' expectations about its ability to create value in the future (Fombrun, 2005; Lange et al., 2011). A strong reputation yields tangible benefits, such as increased employee loyalty, reduced capital and labor costs, higher prices for products, greater decision-making freedom, and a cushion of goodwill during crises (Fombrun, 1996). In contrast, reputational risk refers to the risk of a change in stakeholders' perceptions of a firm's activities and products (Hasan et al., 2022). This involves potential deviations between the ideal corporate reputation and the actual perception held by stakeholders, which can negatively impact the firm (Eccles et al., 2007).

Both concepts rely on stakeholders' perceptions of firms' activities. Activities such as launching a new product, forming an alliance, entering a new market, receiving third-party evaluations, and being mentioned in the media and various networks influence both corporate reputation and reputational risk (Eckert, 2017). For example, successful social responsibility initiatives, such as environmental sustainability programs or community support (Patagonia, 2024), can improve corporate reputation and reduce reputational risk. Conversely, reports of inadequate working conditions, such as worker exploitation or unsafe environmental practices (Palmer, 2023), can increase reputational risk and negatively affect corporate reputation.

The two concepts are not always correlated because they primarily concern different audiences. Customers, employees, potential employees, and strategic partners are more interested in corporate reputation (Baumgartner et al., 2020), while shareholders are more concerned about reputational risk (Chasiotis et al., 2024). This is reflected in the measurement systems used to assess these concepts. Corporate reputation is captured through indicators based on stakeholders' perceptions, such as Fortune's *World's Most Admired Companies* study (Fortune, 2024), which surveys executives, directors, and business analysts. In contrast, reputational risk is captured using indicators related to potential changes in stakeholders' perceptions, such as the intensity of negative corporate news coverage. For example, RepRisk provides a systematic assessment indicator (RRI) of news items based on their scope, severity, and novelty. The RRI ranges from 0 (minimum) to 100 (maximum), with higher values indicating greater exposure to reputational risk (RepRisk, 2024).

As an illustration of the distinctiveness of these two concepts, consider Toyota and Huawei. In 2021, both firms had low reputational risk, as they were not being mentioned in the news as having severe problems. However, their reputations differed significantly: Toyota ranked in the top 20% of firms in terms of corporate reputation, while Huawei was in the bottom 20%. Conversely, Walt Disney and Apple were among the top 10 firms with the highest reputations, but Walt Disney had a low reputational risk while Apple had high reputational risk (Fortune, 2024; RepRisk, 2024).

These discrepancies highlight the critical need for firms to monitor and manage both corporate reputation and reputational risk. As there are many receivers of the same signal, the signal can be interpreted differently by different stakeholders (Park & Patel, 2015). In this regard, Brammer & Pavelin (2006) suggest that reputational assessments are influenced by the congruence between a firm's behaviors, and the preferences and interpretations of various stakeholders. In particular, shareholders and other stakeholders have different concerns and interpretations when it comes to reputation and reputational risk. While shareholders are more focused on the risks associated with reputational damage, other stakeholders (e.g., customers, bond investors, employees, and the general public) are concerned about the firm's overall reputation.

3.3. Hypotheses development

3.3.1 Effects of ESG bonds on corporate reputation and reputational risk

Signaling theory proposes that for a signal to be credible, it must be costly to the issuer and must be observable by the receivers (Bergh et al., 2014). We posit that ESG bonds are costly because the firms issuing them incur expenses beyond those associated with conventional debt instruments. Specifically, firms must financially commit to allocating the raised funds to specific sustainable projects or activities expected to generate a positive impact on society or the environment (ICMA, 2020a, 2020b). This financial commitment represents an opportunity cost because resources can only be directed toward sustainable projects and not toward other investment opportunities that may be more profitable. Furthermore, firms must bear the costs associated with regulatory requirements. They must, for instance, demonstrate compliance with specific sustainability criteria mandated by regulations to gain access to these instruments. Consequently, they must often be certified and assessed by independent bodies to ensure their sustainability (Flammer, 2020), which involves additional compliance costs, such as auditing expenses. Finally, ESG bond issuers are subject to verification and monitoring, which require them to periodically report to the banks issuing these instruments on the allocation of funds and the impact generated. This verification and accountability process can be costly in terms of time and resources (Lau et al., 2022).

ESG bonds are observable signals sent to the market because, in addition to being announced by a firm, these issuances are published in the economic and sustainability press and other media, included in global financial databases, and appear in sustainability rankings, making them easily noticeable by stakeholders. The transparent nature of ESG bonds ensures that stakeholders are well informed about a firm's sustainable practices and commitments, which reinforces the trust and reliability associated with the firm's sustainability efforts. Such transparency not only mitigates information asymmetries between the firm and its stakeholders (Martínez-Ferrero et al., 2016) but can also contribute to reputational benefits by facilitating stakeholder engagement and collaborative innovation (Lian et al., 2023).

ESG bonds' dual attributes of high cost and observability serve as a credible signaling mechanism that demonstrates a firm's genuine commitment to sustainability. These signals positively affect stakeholders, including consumers, bond investors, and employees, thereby enhancing their perceptions of the firm (Fatica & Panzica, 2021). These improved perceptions can lead to increased customer loyalty, greater investor confidence, and enhanced employee morale. As such, they boost the firm's corporate social responsibility (CSR) image, brand loyalty, trust, and reputation among customers, and foster a positive work environment characterized by high employee pride and commitment (Ansari et al., 2021).

In conclusion, we propose that stakeholders perceive ESG bonds as credible signals because they are observable and costly, thereby providing a positive message to stakeholders about the firm's authenticity in committing to sustainable practices. This generates a proactive, positive signal that seeks to attract attention and recognition, which enhances corporate reputation. Therefore, we propose the following baseline hypothesis:

Hypothesis 1a. The issuance of ESG bonds improves the corporate reputation of the issuing firms**.**

Furthermore, the issuance of ESG bonds can create a defensive signal that aims to protect the firm from potential criticism and reputational damage, thereby mitigating reputational risk. The transparency and accountability inherent in the processes of issuing and managing ESG bonds contribute to building trust among shareholders and other stakeholders. By undergoing independent evaluations (with their respective costs) and providing detailed reports on the use of funds and generated impacts, firms reduce uncertainty and skepticism about their sustainability commitments (Fatica & Panzica, 2021). This increased transparency mitigates potential negative perceptions and enhances the firm's credibility. Moreover, it reduces reputational risk because firms that issue these types of financial instruments are often aligned with regulatory norms and expectations, which lowers the risk of sanctions and the consequent negative repercussions of their investments.

This results in credible signals (observable, costly signals) that positively affect financial stakeholders in general, such as shareholders and investment funds, thereby strengthening

their confidence in the firm. This signaling effect has a positive impact on stock prices, which increases the firm's liquidity and financial performance (Flammer, 2019; Tang & Zhang, 2020). Therefore, firms that issue ESG bonds experience reduced reputational risk by lowering perceived shareholder risk, which in turn attracts greater shareholder interest. Therefore, shareholders are increasingly attracted to ESG bonds due to their alignment with sustainability goals, the reduction of reputational risk, and the potential for diversification within their investment portfolios.

As such, the signal generated when ESG bonds are issued may not only improve corporate reputation but also act as a defense mechanism against reputational risk. We propose the following:

Hypothesis 1b. The issuance of ESG bonds mitigates the reputational risk of issuing firms.

3.3.2 Moderating effects of the firm's sustainability performance on corporate reputation and reputational risk

We propose that signals become more credible based on the firm's characteristics. In particular, we posit that the issuer's prior sustainability performance affects stakeholders' perceptions about the issuer's signal. Generally, firms that are leaders in terms of sustainability (i.e., higher sustainability scores) are perceived as emitting more credible signals than firms that lag behind in sustainability (i.e., lower sustainability scores), but the signal is not equally effective for all audiences.

A single signal from the same issuer can be interpreted differently by various audiences due to their differing expectations, time horizons, and objectives (Desjardine et al., 2021). This occurs because "signal receivers are rational in a limited way," and their ability to interpret signals can be influenced by environmental and organizational factors (Park & Patel, 2015). In this case, we separate the audience receiving the issuance signal of ESG bonds into shareholders and the other stakeholders, and assume that these two groups interpret it differently.

Leaders in sustainability performance face higher costs than less sustainable firms because, in addition to the costs of time and financial resources (production costs)

associated with sustainability, they must bear the reputational cost, which refers to the potential loss of corporate reputation (penalty costs) (Gomulya et al., 2019). By issuing ESG bonds, firms risk their corporate reputation if the outcomes of their signals do not meet expectations. If a firm issues ESG bonds and then fails to fulfill its sustainability commitments, it may suffer a significant loss in corporate reputation, as more is expected from it. By taking on the additional cost of issuing these instruments, firms demonstrate a higher level of commitment and effort in their quest to continuously improve their sustainability performance rather than seeking financing for more profitable projects. Other stakeholders interpret this effort as an indication that the firm is not only seeking to maximize profits but also willing to assume social and environmental responsibilities, which can translate into an improvement in corporate reputation.

For firms lagging in sustainability, ESG bonds may be perceived as less credible signals by other stakeholders, who could initially interpret them as attempts at greenwashing (environmental dimension) or wokewashing (social dimension) (Wedari et al., 2021). These terms reflect critiques of firms that attempt to capitalize on other stakeholders' growing concerns about environmental and social issues, respectively, without making real and substantial changes to their operations. For other stakeholders, the issuance of these financial instruments is not considered a significant additional cost for these firms, as firms with poor corporate reputations may have less to lose in terms of corporate reputation (penalty costs) and, therefore, their signals are less credible and do not result in an improvement in corporate reputation.

Thus, the higher penalty costs assumed by sustainability leaders due to the potential reduction in corporate reputation make the improvement in corporate reputation more intense than for firms lagging behind. Therefore, we propose the following:

Hypothesis 2a: The beneficial impact of issuing ESG bonds on corporate reputational enhancement is more pronounced for leading sustainability firms than laggards.

On the other hand, shareholders, who are primarily concerned with the reputational risk of the firms in which they invest (Chasiotis et al., 2024), interpret the signal from the issuance of these financial instruments differently depending on the firm's level of

sustainability. For firms already in leadership positions in terms of sustainability, the margin for improving their reputation is limited. These firms already have a low reputational risk due to their high scores in sustainability rankings, so issuing ESG bonds does not offer the potential for a significant improvement in this regard. However, firms lagging behind in sustainability, which usually have a higher reputational risk, have more room for improvement (Philippe & Durand, 2011). In these cases, issuing ESG bonds becomes a more effective strategy to reduce that risk, as it can be perceived as an effort to improve their sustainability performance. This implies greater potential for mitigating reputational risk, which is valued by shareholders.

Furthermore, shareholders tend to focus on maximizing stock value in the short term (Desjardine et al., 2021). Reductions in reputational risk often have a quicker impact on stock value than improvements in corporate reputation, as the improvement process usually takes longer and is less immediate. Therefore, shareholders are more likely to favorably interpret the issuance of ESG bonds by lagging firms, as those firms have greater capacity to improve their public perception and, consequently, reduce reputational risk more immediately, thereby increasing the value of their shares.

Therefore, compared to sustainability leaders, leaders firms that lag in sustainability will gain more benefits in terms of reducing reputational risk by issuing ESG bonds, as they have more room for improvement in this area, and as their shareholders are more interested in the immediate impacts on stock value. Based on this, we propose the following:

Hypothesis 2b: The beneficial impact of issuing ESG bonds on reputational risk reduction is more pronounced for laggards in sustainability than for leaders.

3.3.3 Moderating effect of debt cost on corporate reputation and reputational risk

Finally, we propose that the credibility of signals is also influenced by the debt cost (production costs), as it affects how different audiences interpret the signal sent by the issuer. According to Sharma (2000), environmental investments can be perceived as either a strategic opportunity that enhances the firm's future or an unnecessary expense that offers no benefits (threat). These interpretations are based on signals that audiences evaluate through cognitive and strategic frameworks. Thus, the same signal can be viewed

as either an opportunity or a burden depending on how it is interpreted by each group (i.e., shareholders and other stakeholders).

Many firms seek external financial resources to sustain and expand their operations (Choi & Wang, 2009). To obtain these resources, firms must provide information about the quality of their economic activities and their repayment capacity (Courtney et al., 2017). In this context, firms face a significant challenge related to the high debt costs driven by the uncertainty surrounding their ability to repay. A higher debt cost means that investors demand a higher interest rate to assume the risk of investing in the firm. This high debt cost reflects lower initial confidence in the firm among investors and the firm's lower credibility (Martins et al., 2020). In this regard, the issuance of ESG bonds is positively valued by other stakeholders, as it demonstrates a direct and active response to these challenges despite the higher costs associated with issuing this type of debt.

Therefore, for other stakeholders, the higher the cost of issuing this type of debt, the more credible the signal becomes, as doing so is more costly and provides an opportunity for the firm to take the improvement of its sustainability more seriously. As a result, the signal of issuing ESG bonds can have a more positive impact on corporate reputation, especially when the debt cost is higher. On this basis, we propose the following:

Hypothesis 3a: The beneficial impact of issuing ESG bonds on corporate reputational enhancement becomes more pronounced when the debt cost is higher.

However, the increase in borrowing costs also raises the risk of corporate default. This directly affects shareholders, who will be affected most if the firm faces financial difficulties (Campbell et al., 2008). The risk of default is a key factor in evaluating a firm, and shareholders take it into account when making investment decisions (Dichev, 1998).

When a firm issues ESG bonds, it discloses information about ESG factors. The disclosure of such information can increase shareholders' confidence and reduce information asymmetries (Atif & Ali, 2021), which improves corporate reputation. However, this benefit of mitigating reputational risk may be limited when the risk of default increases. Although a stronger signal may be confirmed following ESG bond issuance, higher costs of debt have the opposite effect, as they increase the risk of default. Financial problems affect both corporate reputation and reputational risk, with the latter

being more severely affected, as it is directly linked to the value of shares and, consequently, to shareholders. In such cases, rather than viewing the issuance of ESG bonds in contexts with high debt costs as an opportunity, shareholders perceive it as a high expense and believe those funds should instead be invested in more profitable strategic projects aimed at reducing those costs, thereby lowering risk and increasing the value of shares.

Therefore, the mitigation of reputational risk will be less effective as the risk of default increases due to higher debt costs. We propose the following:

Hypothesis 3b: The beneficial impact of issuing ESG bonds on reputational risk reduction is more pronounced when debt cost is lower.

Table 3.1 is a summary of the literature used in each of the hypotheses in section 3.3.

Table 3.1. Hypotheses and literature

Hypothesis	Literature
Hypothesis 1a. The issuance of ESG bonds improves the corporate reputation of the issuing firms	Ansari et al., 2021; Bergh et al., 2014; ICMA, 2020a, 2020b; Fatica & Panzica, 2021; Flammer, 2020; Lau et al., 2022; Lian et al., 2023; Martínez-Ferrero et al., 2016
Hypothesis 1b. The issuance of ESG bonds mitigates the reputational risk of issuing firms	Fatica & Panzica, 2021; Flammer, 2019; Tang & Zhang, 2020
Hypothesis 2a. The beneficial impact of issuing ESG bonds on corporate reputational enhancement is more pronounced for leading sustainability firms than laggards	Desjardine et al., 2021; Gomulya et al., 2019; Park & Patel, 2015; Wedari et al., 2021
Hypothesis 2b. The beneficial impact of issuing ESG bonds on reputational risk reduction is more pronounced for laggards in sustainability than for leaders	Chasiotis et al., 2024; Desjardine et al., 2021; Philippe & Durand, 2011
Hypothesis 3a. The beneficial impact of issuing ESG bonds on corporate reputational enhancement becomes more pronounced when the debt cost is higher	Choi & Wang, 2009; Courtney et al., 2017; Martins et al., 2020; Sharma, 2000
Hypothesis 3b. The beneficial impact of issuing ESG bonds on reputational risk reduction is more pronounced when debt cost is lower	Atif & Ali, 2021; Campbell et al., 2008; Dichev, 1998

Source: Own elaboration.

3.4. Methodology

3.4.1 Data collection and sampling

To compile the sample, we collected data from all firms listed in Fortune's *World's Most Admired Companies* ranking from 2017 through 2023. On average, this ranking included 630 firms each year, with 2017 having the fewest firms (614). We excluded firms that were not included for at least five years, and retained only those present in the rankings for the entire period or missing just one year, as it is statistically more reliable to work with a balanced or almost balanced panel (Kaimal & Uzma, 2024; Kumar et al., 2022). This resulted in a sample of 500 firms.

We searched for all issuances of ESG bonds by the firms in the sample between 2017 and 2022 using a database compiled by the financial data provider Refinitiv Eikon. This database allows for the filtering of ESG bonds. Of the 500 firms, 129 had issued ESG bonds in this period, while 371 did not. The 129 issuing firms conducted a total of 717 issuances of ESG bonds from 2017 through 2022 (six years). Finally, we assembled a panel of annual data from 2017 through 2023 (seven periods) with 500 groups and 3,500 observations.

3.4.1.1 Dependent variable

The first dependent variable is corporate reputation according to Fortune's *World's Most Admired Companies* list. Previous research has assessed corporate reputation in different ways. Most of these studies have analyzed corporate reputation based on rankings like the Fortune ranking (Fombrun & Shanley, 1990; Rehman et al., 2020; Roberts & Dowling, 2002; Tian et al., 2023) or by using customized questionnaires (Daddi et al., 2019; Tran & Adomako, 2022; WY Wong et al., 2014). Fortune conducts an annual ranking of corporate reputation based on a survey of 3,760 executives, directors, and business analysts aimed at identifying the firms that enjoy the strongest corporate reputation within their industries and across industries. The study begins with a universe of about 1,500 candidates with revenues greater than USD 10 billion. From these 1,500 firms, those with the highest revenue from each sector are selected, which results in a sample of about 650 firms from 27 countries. The voting executives work in firms from this group. Using the average aggregation of eight scores, the survey determines each firm's overall corporate reputation score, which ranges from 0 to 9. This variable advances one period ahead of others because the effect of issuing ESG bonds on corporate reputation takes time to materialize.

Fortune's *World's Most Admired Companies* has several advantages over other surveys—it is widely recognized and respected in the business world; it uses a clear and consistent methodology to evaluate firms based on surveys of executives, directors, and analysts, which allows for a structured and comparative framework for the evaluation of corporate reputation; as it uses a standardized set of criteria, it allows for direct comparison of the corporate reputation of different firms within and across sectors; and it is based on the opinions of executives, directors, and analysts who may have in-depth knowledge of the

firms and their practices, which can offer an informed perspective on corporate reputation. Most studies in the literature on strategy and organization examining corporate reputation among the largest firms globally use Fortune's *World's Most Admired Companies*.

The second dependent variable is reputational risk as measured by the Risk Rating Index (RRI) from the RepRisk database. RRI is the index most commonly used to measure this phenomenon. It has been utilized in studies of reputational risk and corporate reputation (Hasan et al., 2022; Li et al., 2017). In addition, it is widely used by financial intermediaries; insurance providers; and institutions like the United Nations, Dow Jones, the Carbon Disclosure Project, Financial Times Stock Exchange (FTSE), and the Norwegian Global Pension Fund (Berkan et al., 2021).

RepRisk states that the RRI is not actually a measure of corporate reputation but rather an indicator of a firm's reputational risk related to ESG issues, and that it is compiled based on media reports on ESG aspects. The database covers more than 200,000 public and private firms worldwide. The data is collected daily using search algorithms that filter news articles from more than 100,000 information sources around the world in any category. RepRisk undertakes a systematic assessment according to the source's scope (high/medium/low), severity (high/medium/low), and novelty (high/low). The RRI ranges from 0 (minimum) to 100 (maximum), with higher values indicating greater exposure to reputational risk. The advantage of using this index is that the analysis of reputational risk is impartial regardless of the researcher's intention (Kölbel et al., 2017), as the data is collected by an independent institution (i.e., RepRisk) rather the researcher.

3.4.1.2 Independent variable

The independent variable is the issuance or non-issuance of ESG bonds. It is a dichotomous variable that takes a value of 1 if the firm issues ESG bonds in that period, and 0 otherwise.

3.4.1.3 Moderating variables

Our first moderating variable is firms' sustainability performance, measured as the ESG Score in the Refinitiv Eikon database. This variable is the weighted average of a firm's

relative rating based on ESG information. The value of this index ranges from 0 to 100, with higher values indicating better sustainability performance. We measure the variable at the time of issuance of the ESG bonds. Our second moderating variable is debt cost, which represents the firm's actual debt cost at the time of the ESG bonds' issuance.

3.4.1.4 Control variables

We control for several factors that can influence corporate reputation and reputational risk. First, we control for firm size using the natural logarithm of total assets. Larger firms tend to have greater visibility and receive more attention for their actions. In line with previous studies (e.g., De Villiers et al., 2011), we transform total assets into their natural logarithm, as doing so helps manage the asymmetrical distribution of total assets, ensuring a more uniform treatment of size differences between firms.

Second, we control for market capitalization, measured as the number of shares multiplied by the share price (Gomulya et al., 2019). Market capitalization reflects a firm's market valuation and can influence perceptions of its financial health and stability. A firm with high market capitalization might be perceived as more stable and less risky. This control ensures that any observed effect is not merely a reflection of the market's perception of the firm's financial strength.

Third, we control for share price. The share price can be an indicator of perceptions of a firm's current and future financial performance as well as market confidence in its management. Changes in corporate reputation or perceptions of reputational risk could be reflected in the share price. By controlling for the share price, we can identify whether changes in corporate reputation or reputational risk due to the issuance of sustainable instruments have an effect independent of perceived financial performance and market confidence.

Fourth, we use leverage, calculated as the ratio of total long-term debt to total assets (Balakrishnan and Fox, 1993; De Villiers et al., 2011), as a control variable. Financial leverage can affect perceptions of a firm's risk and its capacity to undertake sustainable projects. A highly leveraged firm may be viewed as riskier, which could influence how stakeholders interpret the issuance of ESG bonds. This control allows us to examine

whether the relationship between the issuance of ESG bonds and corporate reputation or reputational risk holds when adjusted for the firm's financial risk.

3.4.2 Model

To test our hypotheses, we selected a fixed effects model with robust standard errors as the most appropriate specification. We began by performing the Breusch-Pagan Lagrange multiplier test, which indicated that we should use the random-effects model, discarding OLS, as the result's p-value was less than .05. Subsequently, we conducted the Hausman test to determine whether to use the fixed effects or random effects model. In the Hausman test, the p-value was less than .05, indicating that the fixed effects model was the most appropriate. There are differences between the estimates and the fixed effects model provides consistent estimates.

After a model is chosen, we must check whether it has problems with idiosyncratic errors: heteroscedasticity, autocorrelation, and contemporaneous correlation. First, to determine whether heteroscedasticity existed, we performed the modified Wald test with fixed effects. Our p-value was less than .05, so we rejected the null hypothesis and concluded that heteroscedasticity existed. Second, we investigated whether there was an autocorrelation problem using the Wooldridge test. Our p-value was greater than .05, so we could not reject the null hypothesis or exclude the presence of autocorrelation. Third, we analyzed whether there was a contemporaneous correlation. Although in short panels, as in our case, it is assumed that there is no contemporaneous correlation (Cameron & Trivedi, 2022), we analyzed to be sure. To do so, we calculated the Breusch-Pagan test after the fixed effects model. As our p-value was greater than .05, we could not reject the null hypothesis, which indicates that a contemporaneous correlation did not exist. Therefore, our fixed effects model exhibits heteroscedasticity problems. To correct them, we used robust standard errors.

3.5. Results

Table 3.2 presents the basic descriptive statistics and Pearson correlation coefficients of the variables used in our models. Our results show no high correlations between any of our variables, with the highest being .48 between a control variable and the dependent variable. In addition, we performed tests using variance inflation factors (VIF) to check

for multicollinearity between our variables. The VIF values ranged from 1.01 to 1.92, with a mean of 1.21, suggesting that the correlation between variables did not generate relevant multicollinearity problems in our analysis (Hair et al., 1998).

Table 3.2. Mean, standard deviation, and Pearson correlation[a]

Variable	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8
1. Corporate reputation	6.09	.92	2.4	9.6								
2. Reputational risk	23.30	14.53	.00	66.75	.18***							
3. Issuance of ESG bonds	.08	.27	.00	1.00	.01	.19***						
4. ESG Score	66.53	16.14	8.41	95.74	.22***	.44***	.19***					
5. Debt Cost	3.73	1.94	.03	28.58	-.15***	-.15***	-.09***	-.23***				
6. Size	2.42	1.48	19.12	28.95	.20***	.48***	.32***	.44***	-.21***			
7. Market Capitalization	6.09e+10	1.85e+11	1.91e+08	4.06e+12	.29***	.31***	.06***	.07***	-.07***	.27***		
8. Price	96.97	208.71	.32	4980.21	.17***	-.02	-.01	-.06***	-.03†	-.04*	.06***	
9. Leverage	.29	.19	.00	2.44	.01	-.01	-.02	-.08***	.28***	-.12***	-.07***	-.02

[a] N=500. Significance level †.10; *.05; **.01; ***.001.

The model results are presented in Tables 3.3 and 3.4 Table 3.3 displays the results for Hypotheses 1a, 2a, and 3a (corporate reputation), while Table 3.4 presents the results for Hypotheses 1b, 2b, and 3b, (reputational risk). In both tables, Model 1 represents the baseline model and includes the control variables. Model 2 includes the direct effects of ESG bonds (H1a and H1b). Model 3 examines the moderating effects of the firm's sustainability performance (H2a and H2b), and Model 4 explores the moderating effects of debt costs (H3a and H3b).

Table 3.3. The effect of ESG bonds on corporate reputation[a]

	Model 1	Model 2	Model 3	Model 4
Control Variables	***b (SE)***	***b (SE)***	***b (SE)***	***b (SE)***
Size	.17** (-.05)	.16** (.05)	.17** (.06)	.17** (.05)
Market Capitalization	-.00** (-.00)	-.00** (-.00)	-.00** (-.00)	-.00** (-.00)
Price	.00* (.00)	.01* (.01)	.00* (.00)	.00* (.00)
Leverage	-.13 (-18)	-.13 (.18)	-.10 (.19)	-.08 (.18)
ESG bonds Direct Effect		**.07* (.04)**	.02 (.04)	.10* (.04)
ESG Score			-.00 (.01)	
Debt Cost				-.03*** (.01)
Moderating effects				
ESG bonds x ESG Score			**.01* (.01)**	
ESG bonds x Debt Cost				**.04* (.02)**
Constant	1.97 (1.30)	2.17† (1.30)	1.95 (1.38)	1.97 (1.31)
Δ F (df)	6.98*** (3)	4.27* (1)	4.52* (1)b	4.98* (1)b

Notes: nonstandardized (*b*) and standard errors (*SE*).
[a] N=500. Significance level †.10; *.05; **.01; ***.001.
[b] Model 2 as reference.

Table 3.4. The effect of ESG bonds on corporate reputational risk[a]

	Model 1	Model 2	Model 3	Model 4
Control Variables	***b (SE)***	***b (SE)***	***b (SE)***	***b (SE)***
Size	-1.37† (.72)	-1.20† (.72)	-0.78 (.71)	-1.20† (.69)
Market Capitalization	-.00† (-.00)	-.00 (-.00)	-.00† (-.00)	-.00** (-.00)
Price	-.01** (.00)	.01* (.00)	-.01** (.00)	-.00** (.00)
Leverage	-.05 (2.20)	-.04 (2.21)	.42 (2.21)	1.37 (2.22)
ESG bonds Direct Effect		**-1.44** (.53)**	-.59 (.73)	-.1.62** (.55)
ESG Score			-.04† (.02)	
Debt Cost				-.34*** (.10)
Moderating effects				
ESG bonds x ESG Score			**-.11* (.05)**	
ESG bonds x Debt Cost				**-.21 (.23)**
Constant	56.94*** (11.44)	52.95** (17.34)	42.69* (17.16)	52.72** (16.64)
Δ F (df)	6.11*** (3)	7.48** (1)	3.98* (1)b	0.82 (1)b

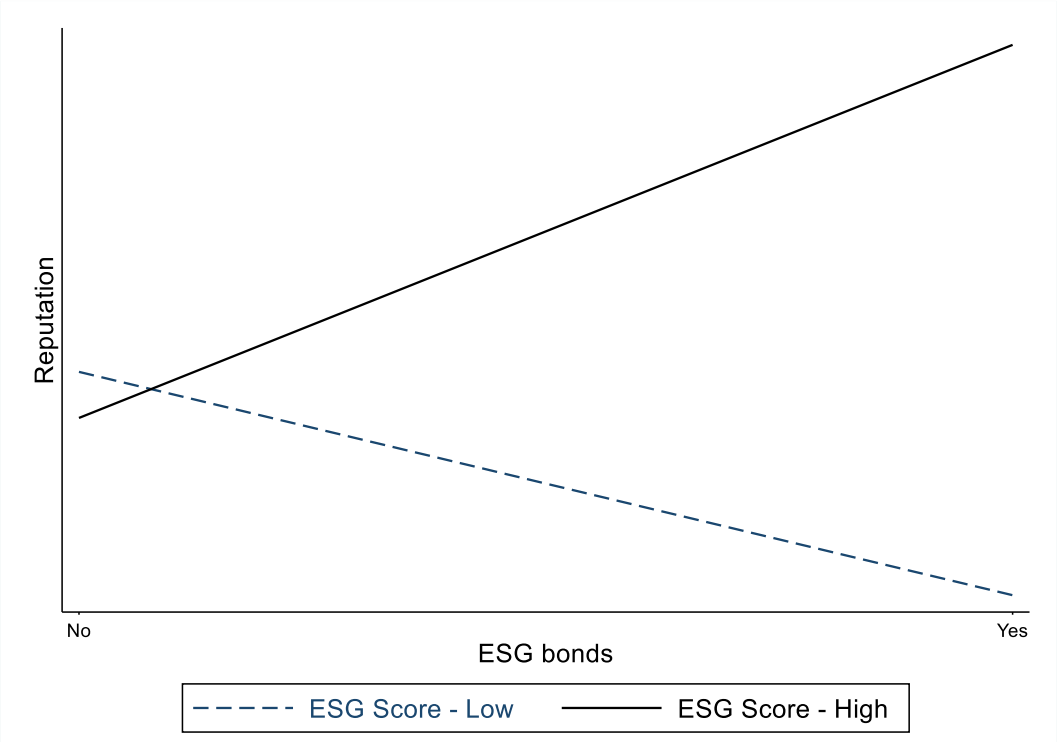
Notes: nonstandardized (*b*) and standard errors (*SE*).
[a] N=500. Significance level †.10; *.05; **.01; ***.001.
[b] Model 2 as reference.

H1a predicts that the issuance of ESG bonds enhances the corporate reputation of the issuing firm. Model 2 in Table 3.3 shows that the coefficient of the variable representing the issuance of ESG bonds is significant (p-value < .05) as is its model F(1) (p-value < .05). This supports H1a. H1b predicts that the issuance of ESG bonds mitigates the reputational risk of the issuing firm. Model 2 in Table 3.4 shows that the coefficient of the variable representing the issuance of ESG bonds is significant (p-value < .01) as is its model F(1) (p-value < .01). This supports H1b.

H2a proposes that the beneficial impact of issuing ESG bonds on corporate reputational enhancement is more pronounced for leading sustainability firms than for laggards, while

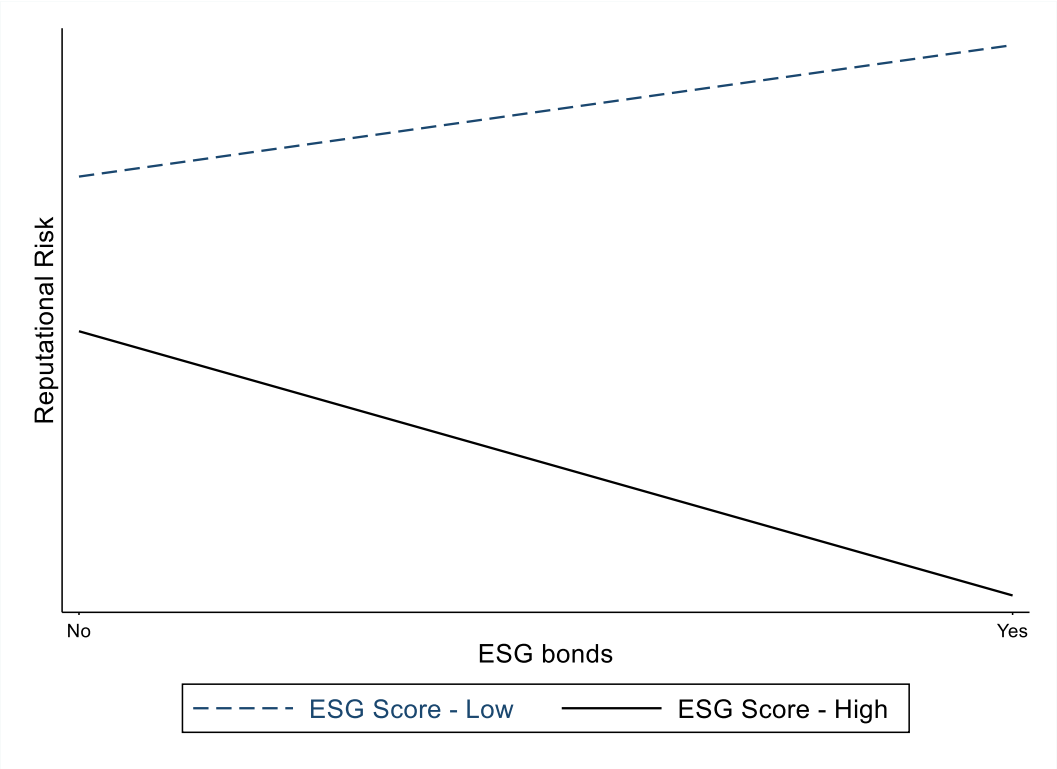
H2b proposes that prior sustainable firm performance has a negative effect on the relationship between ESG bonds and reputational risk mitigation. Model 3 in Table 3.3 (H2a) shows significant moderating effects (p-value < .05) as does its model F(1) (p-value < .05). Figure 1 shows the moderation results. Figure 1 demonstrates that while sustainability leaders enhance their corporate reputation by issuing ESG bonds, the corporate reputation of laggard firms that issue ESG bonds declines. In other words, when firms perform poorly in terms of sustainability performance, the positive effect of ESG bonds on reputation not only diminishes but turns negative. These results support H2a. Model 3 in Table 3.4 (H2b) shows significant moderating effects (p-value < .05) as does its model F(1) (p-value < .05). Figure 2 shows the moderation results. Figure 2 highlights an effect similar to Figure 1—while sustainability leaders mitigate their reputational risk by issuing ESG bonds, laggards that issue ESG bonds increase their reputational risk. As these results are the opposite of what is proposed in the hypothesis, we reject H2b.

Figure 3.1. The moderating effect of the firm's sustainability performance on corporate reputation following the issuance of ESG bonds



Source: Own elaboration

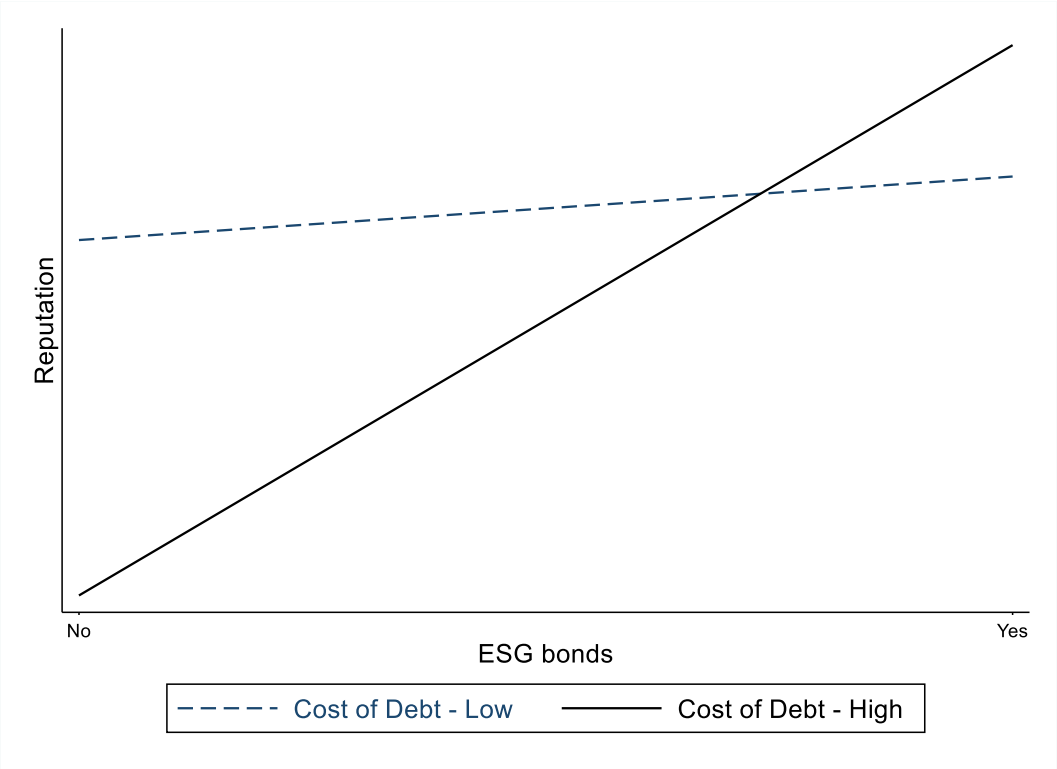
Figure 3.2. The moderating effect of the firm's sustainability performance on reputational risk following the issuance of ESG bonds



Source: Own elaboration

Finally, we analyze whether the debt cost produces a stronger (H3a) or weaker (H3b) effect on this relationship. Model 4 in Table 3.3 (H3a) shows significant moderating effects (p-value < .05) as does its model F(1) (p-value < .05). Figure 3 shows the moderation results. In this case, firms with higher debt costs enhance their corporate reputation more intensely after issuing ESG bonds than firms with lower debt costs. These results support H3a. Model 4 in Table 3.4 (H3b) shows non-significant moderating effects (p-value > .05) as does its model F(1) (p-value > .05). Therefore, we reject H3b.

Figure 3.3. The moderating effect of debt cost on corporate reputation following the issuance of ESG bonds



Source: Own elaboration

3.6. Discussion

Studies on corporate sustainability have extensively examined how different sustainability signals influence firms' reputations. Prior research has linked several corporate actions to reputational improvements, including proactive environmental strategies (Nguyen & Adomako, 2021), environmental disclosure (Toms, 2002), and the internalization of environmental management systems (Marrucci et al., 2022; Daddi et al., 2021). In addition, firms with a strong reputation in corporate sustainability tend to enjoy enhanced stakeholder perceptions (Kim et al., 2021).

Beyond these direct effects, sustainable business practices can contribute to long-term organizational resilience, as they can enable firms to mitigate risks and maintain financial stability (Ortiz-de-Mandojana & Bansal, 2016). As financial stability fosters stakeholder confidence, this resilience may indirectly reinforce corporate reputation. Moreover, the relationship between CSR and financial performance has been found to follow a

curvilinear pattern, where deeper engagement in sustainability initiatives is associated with stronger financial outcomes in the long run (Barnett & Salomon, 2006). Given that financial success can enhance stakeholder trust, these effects may further support reputational gains.

In the context of the growing stakeholder awareness that firms must address ESG challenges, the issuance of ESG bonds is becoming one of the most prominent signals that firms can use to show their commitment to these issues (Bakken, 2021). While ESG bonds offer a pathway for firms to secure financing, previous research indicates that the pricing advantage (i.e., sustainability premium) yields mixed, negligible, or no effects (Flammer, 2021; Larcker & Watts, 2020; Tang & Zhang, 2020). In addition, studies on corporate sustainability have explored whether issuing ESG bonds improves a firm's sustainability performance, but the results have been inconclusive (Fatica & Panzica, 2021; Ordonez-Borrallo et al., 2024). For that reason, this study goes beyond the purely financial benefits or potential improvements in corporate sustainability performance resulting from the issuance of ESG bonds to explore more intangible outcomes, such as enhanced corporate reputation and reduced reputational risk. In fact, the extant literature offers little evidence on the effects of issuing ESG bonds on reputational improvement. Only Lian et al. (2023) have analyzed this relationship using corporate reputation as a moderator between the issuance of green bonds and green collaborative innovation. Other researchers have claimed that ESG bonds have a signaling effect, as they show stakeholders the firms' commitment to sustainability (Arévalo et al., 2024; Flammer, 2021; Tang & Zang, 2020). However, none of these studies have explored how this signaling affects the company's reputation or its reputational risk.

We go beyond the extant literature by separately analyzing the two different but related aspects of reputational improvement—corporate reputation and reputational risk—to offer a holistic view of the issuance effect on different stakeholders, as it may vary. In so doing, we acknowledge that shareholders are typically more sensitive to reputational risk, while other stakeholders often focus on corporate reputation.

Our findings show that ESG bonds act as an observable and costly signal in terms of direct monetary and non-monetary costs. The results confirm that, overall, ESG bonds lead to both higher corporate reputation and reduced reputational risk. A potential

explanation is that stakeholders perceive an ESG bond's issuance as a tangible demonstration of a firm's commitment to sustainability.

We also analyzed how shareholders and other stakeholders interpret the issuance of ESG bonds in specific contexts. First, we analyzed the effect of the issuance of ESG bonds depending on the issuer's prior sustainability performance. In the case of sustainability-leading firms, which face a higher risk of reputational loss if they fail to meet expectations, the issuance of ESG bonds translates into a more pronounced improvement in corporate reputation and greater effectiveness in mitigating reputational risk. Both shareholders and other stakeholders interpret these firms' signals as more credible given that they have already invested in maintaining high sustainability standards and, thus, face a higher reputational cost if they fall short. In contrast, sustainability laggards not only fail to achieve comparable improvements in corporate reputation but may even experience a deterioration and an increase in reputational risk after issuing ESG bonds. For shareholders and other stakeholders, these firms face a lower potential reputational cost and, therefore, their signals are less convincing. This lack of credibility may be associated with perceptions of greenwashing or wokewashing, as the issuance of ESG bonds without robust sustainability commitments can be viewed as attempts to merely polish the firm's image. Consequently, these issuances invite heightened scrutiny and can trigger negative evaluations of firms' sustainability performance rather than create trust.

Second, we focused on the monetary costs (i.e., interest payments) associated with issuing ESG bonds. Our findings show that firms facing higher debt costs experience a more pronounced improvement in corporate reputation. Other stakeholders may interpret these higher costs as reflecting a stronger commitment to sustainability because they suggest a willingness to devote more financial resources to these initiatives. However, we do not find a significant moderating effect on reputational risk, which is primarily scrutinized by shareholders. Our results suggest that shareholders may not perceive higher debt costs as an effective mechanism for mitigating reputational risk, as their concerns often focus on safeguarding financial returns and reducing default risks rather than developing in-depth interpretations of sustainability investments. In other words, while elevated costs may enhance the perceived credibility of a firm's sustainability efforts among a broader set of stakeholders and, thus, boost corporate reputation, they do not necessarily alleviate shareholders' concerns regarding reputational risk. Therefore, distinguishing between

corporate reputation and reputational risk is essential, as the signal emitted by a firm may influence the two concepts differently—stakeholders will respond differently depending on their specific priorities and evaluation criteria.

3.7. Conclusions, limitations, and future research

This study analyzes the effect of ESG bond issuance on firms' reputations under different scenarios. Our research contributes to the literature on sustainable finance (Arévalo et al., 2024; Lian et al., 2023; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020) and signaling theory (Brammer & Pavelin, 2006; DesJardine et al., 2021; Park & Patel, 2015) in several ways. First, our study adds to the extant literature on sustainable finance by extending the analysis of how firms strategically use ESG bonds to shape their reputational positioning (Lian et al., 2023). Our study shows that the issuance of ESG bonds has a significant impact on reputational improvements in terms of both corporate reputation and reputational risk mitigation. Our findings highlight that ESG bonds function as observable, costly signals that reinforce firms' commitments to sustainability and enhance their credibility among stakeholders.

In addition, previous research on sustainable finance has mainly focused on the effects of ESG bonds on the issuance premium (Flammer, 2021; Larcker & Watts, 2020) and sustainability performance (Ordonez-Borrallo et al., 2024). We extend this stream of research by showing that firms issue ESG bonds not only to derive these benefits but also as a strategic mechanism to enhance corporate reputation and mitigate reputational risk. By analyzing a broad set of ESG bonds, including green bonds, social bonds, sustainability bonds, and sustainability-linked bonds, our study provides a more comprehensive view of how these financial instruments contribute to sustainability objectives beyond environmental concerns. This broader scope is essential for understanding how firms leverage ESG bonds to address both social and environmental challenges, which reinforces the role of sustainable finance in corporate strategy.

Second, research on corporate sustainability has extensively used signaling theory to examine the effects of certain sustainable actions on firms' reputations. We contribute to this line of research by showing that the effects of ESG bonds on corporate reputation and reputational risk depend on the cost of the signal. Firms with higher signaling costs

in the form of either potential reputational loss or direct financial costs experience stronger reputational benefits. In particular, sustainability-leading firms, which face potentially higher penalty costs for greenwashing, experience a more pronounced improvement in corporate reputation and greater effectiveness in mitigating reputational risk after issuing ESG bonds. Conversely, sustainability-lagging firms not only fail to achieve comparable improvements but may even experience a deterioration in their corporate reputation and an increase in their reputational risk. A potential explanation is that stakeholders may interpret their issuance of ESG bonds as opportunistic or superficial.

Our study also shows that debt costs play a crucial role in shaping the reputational impact of ESG bonds. Firms with higher borrowing costs experience a more pronounced improvement in corporate reputation, as other stakeholders seem to interpret this financial commitment as a credible sustainability signal. However, this does not imply a reduction in their reputational risk. Shareholders, who are more sensitive to financial risks, may view high debt costs as a threat rather than a positive sign of sustainability commitment. This finding implies that corporate reputation and reputational risk are distinct constructs that do not always move in tandem. Under certain conditions, an increase in corporate reputation does not imply a corresponding reduction in reputational risk. Therefore, managers need to establish a holistic plan when using ESG bonds as a signal of their sustainability efforts.

We also expand the literature addressing the fact that different audiences have distinct interpretations of the same signal (DesJardine et al., 2021; Park & Patel, 2015). In this regard, we differentiate between shareholders and other stakeholders, and demonstrate that under certain firm-internal circumstances, such as debt costs, the interpretation of the signal associated with the issuance of ESG bonds varies. Furthermore, our findings suggest that, for other stakeholders, a prior high position in terms of sustainability or higher debt costs amplify the benefits of ESG bond issuance for corporate reputation. For that reason, we believe that signaling theory should consider not only the cost and visibility of the signal but also the identity of the recipient and the organizational context. We believe that these new variables will add a layer of complexity to the analysis of signals in the sustainable finance and corporate sustainability domains.

We recognize that this study has some limitations. First, the use of the Fortune corporate reputation variable leads to a sample focused on U.S. and Fortune-ranked firms. This presents an opportunity for future research that expands the geographical scope, thereby enhancing the global understanding of the impact of ESG bond issuance on corporate reputation. Second, while this study expands the scope beyond green bonds to include all types of ESG bonds, certain financial instruments within this category may require further analysis, as their effects on corporate reputation and reputational risk may vary. Third, the Refinitiv ESG Score may be mildly upward biased: more extensive disclosure often boosts ratings (Christensen et al., 2022), and larger firms tend to score higher (Drempetic et al., 2020). Hence, part of the moderating effect, especially on debt cost, could stem from reporting capacity rather than purely from sustainability performance.

Finally, this study has practical implications, as it provides a solid basis for understanding the role of sustainability in corporate finance, and offers guidance for both firms and investors on implementing financial strategies aligned with ESG objectives. For firms interested in improving their stakeholders' perceptions and reducing reputational risk, the adoption of ESG bonds presents itself as an effective strategy. These instruments not only reinforce the firm's commitment to sustainability but also send a positive message to investors and consumers, who increasingly value environmental and social responsibility. Moreover, the study suggests that diversifying into a variety of ESG bonds that cover both environmental and social goals can maximize the positive impact on corporate reputation. Such diversification allows firms to address different needs and adapt to various sustainability contexts.

References

Ansari, N. Y., Farrukh, M., & Raza, A. (2021). Green human resource management and employees pro-environmental behaviours: Examining the underlying mechanism. *Corporate Social Responsibility and Environmental Management*, *28*(1), 229-238.

Atif, M., & Ali, S. (2021). Environmental, social, and governance disclosure and default risk. *Business Strategy and the Environment*, *30*(8), 3937-3959.

Arévalo, G., González, M., Guzmán, A., & Trujillo, M. A. (2024). The value effect of sustainability: evidence from Latin American ESG bond market. *Journal of Sustainable Finance & Investment*, 1-22.

Aula, P., & Heinonen, J. (2016). Risk of risks. In P. Aula & J. Heinonen (Eds.), *The reputable firm: How digitalization of communication is revolutionizing reputation management* (pp. 133–162). Springer.

Balakrishnan, S., & Fox, I. (1993). Asset specificity, firm heterogeneity and capital structure. *Strategic Management Journal*, *14*(1), 3-16.

Baumgartner, K. T., Ernst, C. A., & Fischer, T. M. (2020). How corporate reputation disclosures affect stakeholders' behavioral intentions: mediating mechanisms of perceived organizational performance and corporate reputation. *Journal of Business Ethics*, 1-29.

Bakken, R. 2021. What Is Sustainable Finance and Why Is It Important? *Harvard Extension School Blog*. Available at: http://surl.li/loeosh (accessed 25 May 2024).

Barnett, M. L., & Salomon, R. M. (2006). Beyond dichotomy: The curvilinear relationship between social responsibility and financial performance. *Strategic Management Journal*, *27*(11), 1101-1122.

Benlemlih, M., Jaballah, J., & Kermiche, L. (2023). Does financing strategy accelerate corporate energy transition? Evidence from green bonds. *Business Strategy and the Environment*, *32*(1), 878-889.

Ben Slimane, M., Roncalli, T., & Semet, R. (2023). Green vs. social bond premium. *SSRN*. http://surl.li/xtlrco.

Bergh, D. D., Connelly, B. L., Ketchen Jr, D. J., & Shannon, L. M. (2014). Signaling theory and equilibrium in strategic management research: An assessment and a research agenda. *Journal of Management Studies*, *51*(8), 1334-1360.

Berkan, A., Leonardo, B., & Stefano, M. (2021). Media coverage, corporate social irresponsibility conduct, and financial analysts' performance. *Corporate Social Responsibility and Environmental Management*, *28*(5), 1456-1470.

Brammer, S. J., & Pavelin, S. (2006). Corporate reputation and social performance: The importance of fit. *Journal of Management Studies*, *43*(3), 435-455.

Cameron, A. C., & Trivedi, P. K. (2022). *Microeconometrics using Stata* (2nd ed.). Stata Press.

Campbell, J. Y., Hilscher, J., & Szilagyi, J. (2008). In search of distress risk. *Journal of Finance*, *63*(6), 2899-2939.

Chasiotis, I., Gounopoulos, D., Konstantios, D., & Patsika, V. (2024). ESG reputational risk, corporate payouts and firm value. *British Journal of Management*, *35*(2), 871-892.

Choi, J., & Wang, H. (2009). Stakeholder relations and the persistence of corporate financial performance. *Strategic Management Journal*, *30*(8), 895-907.

Christensen, D. M., Serafeim, G., & Sikochi, A. (2022). Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review*, *97*(1), 147-175.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, *37*(1), 39-67.

Courtney, C., Dutta, S., & Li, Y. (2017). Resolving information asymmetry: Signaling, endorsement, and crowdfunding success. *Entrepreneurship Theory and Practice*, *41*(2), 265-290.

Daddi, T., Iraldo, F., Testa, F., & De Giacomo, M. R. (2019). The influence of managerial satisfaction on corporate environmental performance and reputation. *Business Strategy and the Environment, 28*(1), 15-24.

Daddi, T., Heras-Saizarbitoria, I., Marrucci, L., Rizzi, F., & Testa, F. (2021). The effects of green supply chain management capability on the internalisation of environmental management systems and organisation performance. *Corporate Social Responsibility and Environmental Management*, *28*(4), 1241-1253.

De Villiers, C., Naiker, V., & Van Staden, C. J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management*, *37*(6), 1636-1663.

DesJardine, M. R., Marti, E., & Durand, R. (2021). Why activist hedge funds target socially responsible firms: The reaction costs of signaling corporate social responsibility. *Academy of Management Journal*, *64*(3), 851-872

Dichev, I. D. (1998). Is the risk of bankruptcy a systematic risk? *Journal of Finance*, *53*(3), 1131-1147.

Drempetic, S., Klein, C., & Zwergel, B. (2020). The influence of firm size on the ESG score: Corporate sustainability ratings under review. *Journal of business ethics*, *167*(2), 333-360.

Eccles, R. G., Newquist, S. C., & Schatz, R. (2007). Reputation and its risks. *Harvard Business Review*, *85*(2), 104.

Eckert, C. (2017). Corporate reputation and reputation risk: Definition and measurement from a (risk) management perspective. *Journal of Risk Finance*, *18*(2), 145-158.

Environmental Finance (2024). *Database Environmental Finance.* Available at: http://surl.li/lssebu (accessed 25 January 2024).

Elliott, W. B., Prevost, A. K., & Rao, R. P. (2009). The announcement impact of seasoned equity offerings on bondholder wealth. *Journal of Banking & Finance*, *33*(8), 1472-1480.

Fanasch, P. (2019). Survival of the fittest: The impact of eco-certification and reputation on firm performance. *Business Strategy and the Environment*, *28*(4), 611-628.

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment*, *30*(5), 2688-2701.

Feldhütter, P., Halskov, K., & Krebbers, A. (2024). Pricing of sustainability-linked bonds. *Journal of Financial Economics*, *162*, 103944.

Flammer, C. (2020). Green bonds: effectiveness and implications for public policy. *Environmental and Energy Policy and the Economy*, *1*(1), 95-128.

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics*, *142*(2), 499-516.

Fombrun, C. J. (2005). Corporate reputations as economic assets. In M. A. Hitt, R. E. Freeman, & J. S. Harrison (Eds.), *The Blackwell Handbook of Strategic Management* (pp. 285-308). Blackwell Publishing.

Fombrun, C. J. (1996). Realizing value from the corporate image. Harvard Business School Press, Boston, MA.

Fombrun, C., & Shanley, M. (1990). What's in a name? Reputation building and corporate strategy. *Academy of Management Journal*, *33*(2), 233-258.

Fortune (2024). *World's Most Admired Companies*. Available at: http://surl.li/xtgzun (accessed 15 May 2024).

Gomulya, D., Jin, K., Lee, P. M., & Pollock, T. G. (2019). Crossed wires: Endorsement signals and the effects of IPO firm delistings on venture capitalists' reputations. *Academy of Management Journal*, *62*(3), 641-666.

Gonzalez-Ruiz, J. D., Marín-Rodríguez, N. J., & Weber, O. (2024). New insights on social finance research in the sustainable development context. *Business Strategy and Development*, *7*(1), e342.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis*. Prentice Hall.

Hart, S. L., & Dowell, G. (2011). Invited editorial: A natural-resource-based view of the firm: Fifteen years after. *Journal of Management*, *37*(5), 1464-1479.

Hasan, M. M., Habib, A., & Zhao, R. (2022). Corporate reputation risk and cash holdings. *Accounting & Finance*, 62(1), 667-707.

Huang, Y., Francoeur, C., & Brammer, S. (2022). What drives and curbs brownwashing?. *Business Strategy and the Environment*, 31(5), 2518-2532.

ICMA (2020a). *Green, social and sustainability bonds: A high-level mapping to the sustainable development goals 2020*. Available at: http://surl.li/ihfnyi (accessed 18 September 2023).

ICMA (2020b). *Sustainability-linked bonds principles. Voluntary process guidelines 2020*. Available at: http://surl.li/hqvsal (accessed 18 September 2023).

ICMA (2020c). *Sustainable Finance High-level definitions*. Zürich: International Capital Market Association. Available at*:* http://surl.li/fbutms (accessed 18 September 2023).

Kaimal, A., & Uzma, S. H. (2024) CSR and ownership structure: Moderating role of board characteristics in an emerging country context. *Corporate Social Responsibility and Environmental Management*.

Kim, S., Terlaak, A., & Potoski, M. (2021). Corporate sustainability and financial performance: Collective reputation as moderator of the relationship between environmental performance and firm market value. *Business Strategy and the Environment*, *30*(4), 1689-1701.

Kölbel, J. F., Busch, T., & Jancso, L. M. (2017). How media coverage of corporate social irresponsibility increases financial risk. *Strategic Management Journal*, *38*(11), 2266-2284.

Kumar, A., Gupta, J., & Das, N. (2022). Revisiting the influence of corporate sustainability practices on corporate financial performance: An evidence from the global energy sector. *Business Strategy and the Environment*, *31*(7), 3231-3253.

Lange, D., Lee, P. M., & Dai, Y. (2011). Organizational reputation: A review. *Journal of Management*, *37*(1), 153-184.

Larcker, D. F., & Watts, E. M. (2020). Where's the greenium? *Journal of Accounting and Economics*, *69*(2-3), 101312.

Lau, P., Sze, A., Wan, W., & Wong, A. (2022). The economics of the Greenium: How much is the world willing to pay to save the earth? *Environmental and Resource Economics*, *81*(2), 379-408.

Li, S., Ngniatedema, T., & Chen, F. (2017). Understanding the impact of green initiatives and green performance on financial performance in the US. *Business Strategy and the Environment*, 26(6), 776-790.

Lian, J., Huang, X., & Wu, X. (2024). How green bonds promote firms' green collaborative innovation?. *Corporate Social Responsibility and Environmental Management*, *31*(3), 2109-2126.

Love, E. G., & Kraatz, M. (2009). Character, conformity, or the bottom line? How and why downsizing affected corporate reputation. *Academy of Management Journal, 52(2)*, 314-335.

Madhavan, R., & Prescott, J. E. (1995). Market value impact of joint ventures: The effect of industry information-processing load. *Academy of Management Journal*, *38*(3), 900-915.

Makpotche, M., Bouslah, K., & M'Zali, B. (2024). Long-run performance following corporate green bond issuance. *Managerial Finance*, *50*(1), 140-178.

Mathew, S., & Sivaprasad, S. (2024). An empirical analysis of corporate sustainability bonds. *Business Strategy and the Environment*, *33*(4), 3299-3316.

Martínez-Ferrero, J., Ruiz-Cano, D., & García-Sánchez, I. M. (2016). The causal link between sustainable disclosure and information asymmetry: The moderating role of the stakeholder protection context. *Corporate Social Responsibility and Environmental Management*, *23*(5), 319-332.

Martins, H. C., Schiehll, E., & Terra, P. R. S. (2020). Do shareholder protection and creditor rights have distinct effects on the association between debt maturity and ownership structure? *Journal of Business Finance & Accounting*, *47*(5-6), 708-729.

Marrucci, L., Daddi, T., & Iraldo, F. (2022). Do dynamic capabilities matter? A study on environmental performance and the circular economy in European certified organisations. *Business Strategy and the Environment*, *31*(6), 2641-2657.

Mollenkopf, D. A., Peinkofer, S. T., & Chu, Y. (2022). Supply chain transparency: Consumer reactions to incongruent signals. *Journal of Operations Management*, *68*(4), 306-327.

Nguyen, N. P., & Adomako, S. (2021). Environmental proactivity, competitive strategy, and market performance: The mediating role of environmental reputation. *Business Strategy and the Environment*, *30*(4), 2008-2020.

Norheim-Hansen, A. (2015). Are 'green brides' more attractive? An empirical examination of how prospective partners' environmental reputation affects the trust-based mechanism in alliance formation. *Journal of Business Ethics*, *132*, 813-830.

Ordonez-Borrallo, R., Ortiz-de-Mandojana, N., & Delgado-Ceballos, J. (2024). Green bonds and environmental performance: The effect of management attention. *Corporate Social Responsibility and Environmental Management, 31(6),* 5311-5326.

Ortiz-de-Mandojana, N., & Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal*, *37*(8), 1615-1631.

Patagonia (2024). *Social Responsibility*. Available at: http://surl.li/ttadvh (accessed 10 May 2024).

Palmer, A. (2023). *Amazon cited by Labor Department for exposing warehouse workers to safety hazards*. *CNBC*. Available at: http://surl.li/nxkkge (accessed 10 May 2024).

Park, H. D., & Patel, P. C. (2015). How does ambiguity influence IPO underpricing? The role of the signaling environment. *Journal of Management Studies*, *52*(6), 796-818.

Philippe, D., & Durand, R. (2011). The impact of norm-conforming behaviors on firm reputation. *Strategic Management Journal*, *32*(9), 969-993.

Reboredo, J. C. (2018). Green bond and financial markets: Co-movement, diversification and price spillover effects. *Energy Economics*, *74*, 38-50.

Rehman, Z. U., Khan, A., & Rahman, A. (2020). Corporate social responsibility's influence on firm risk and performance: The mediating role of firm reputation. *Corporate Social Responsibility and Environmental Management*, *27*(6), 2991-3005.

RepRisk (2024). *RepRisk methodology overview*. Available at: http://surl.li/jzpsao (accessed 12 May 2024).

Rindova, V. P., Williamson, I. O., Petkova, A. P., & Sever, J. M. (2005). Being good or being known: An empirical examination of the dimensions, antecedents, and consequences of organizational reputation. *Academy of Management Journal*, *48*(6), 1033-1049.

Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic Management Journal*, *23*(12), 1077-1093.

Ross, S. A. (1977). The determination of financial structure: The incentive-signaling approach. *The Bell Journal of Economics*, *8*(1), 23-40.

Schepker, D. J., Oh, W. Y., & Patel, P. C. (2018). Interpreting equivocal signals: Market reaction to specific-purpose poison pill adoption. *Journal of Management*, *44*(5), 1953-1979.

Sharma, S. (2000). Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal*, *43*(4), 681-697.

Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics*, 87, 355-374.

Spence, M. (2002). Signaling in retrospect and the informational structure of markets. *American Economic Review*, *92*(3), 434-459.

Stanwick, P. A., & Stanwick, S. D. (2001). CEO compensation: does it pay to be green?. *Business Strategy and the Environment*, *10*(3), 176-182.

Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance*, *61*, 101427.

Tian, T. Y., King, B. G., & Smith, E. B. (2023). Effect of organizational status on employment-related corporate social responsibility: Evidence from a regression discontinuity approach. *Strategic Management Journal*, *44*(12), 2833-2857.

Toms, J. S. (2002). Firm resources, quality signals and the determinants of corporate environmental reputation: some UK evidence. *British Accounting Review*, *34*(3), 257-282.

Tran, M. D., & Adomako, S. (2022). How environmental reputation and ethical behavior impact the relationship between environmental regulatory enforcement and environmental performance. *Business Strategy and the Environment*, *31*(5), 2489-2499.

Wedari, L. K., Jubb, C., & Moradi-Motlagh, A. (2021). Corporate climate-related voluntary disclosures: Does potential greenwash exist among Australian high emitters reports?. *Business Strategy and the Environment*, *30*(8), 3721-3739.

Wu, C. W., & Reuer, J. J. (2021). Acquirers' reception of signals in M&A markets: Effects of acquirer experiences on target selection. *Journal of Management Studies, 58*(5), 1237-126.

WY Wong, C., Lai, K. H., Shang, K. C., & Lu, C. S. (2014). Uncovering the value of green advertising for environmental management practices. *Business Strategy and the Environment, 23*(2), 117-130.

Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, *98*, 39-60.

CAPÍTULO 4:

ESG BONDS AND STOCK-MARKET REACTIONS: AN EVENT STUDY

4.1. Introduction

Environmental, social, and governance (ESG) bonds (also known as sustainable bonds) have established themselves as strategic tools for firms seeking to finance corporate sustainability initiatives while obtaining financial benefits (Di Marco et al., 2023; Roggi et al., 2024). These bonds have experienced notable growth, reflecting their capacity to channel financing toward environmental and social projects that contribute to the transition toward a more sustainable economy (Mathew & Sivaprasad, 2024), and showing the interest of the corporate and financial sectors in aligning financial objectives with sustainability aims. According to Environmental Finance (2024), the issuance of these instruments doubled from USD 450 billion in 2020 to USD 875 billion in 2023, thereby increasing their prominence in the global financial landscape. Consequently, the emergence of ESG bonds represents a paradigm shift in sustainability financing, as it aligns capital allocation with corporate sustainability objectives.

ESG bonds are financial instruments issued by firms that may issue one or more at a time. They may take the form of green bonds, social bonds, sustainability bonds, or sustainability-linked bonds (SLBs), and they offer firms ways of financing projects expected to generate measurable environmental and social benefits (Feldhütter, Halskov, & Krebbers, 2024). While green bonds prioritize environmental projects like renewable energy projects (Tang & Zhang, 2020), social bonds address social challenges, such as affordable housing and healthcare (Gonzalez-Ruiz, Marín-Rodríguez, & Weber, 2024). Sustainability bonds integrate environmental and social projects to offer a comprehensive approach to corporate responsibility (Mathew & Sivaprasad, 2024). SLBs link their financial terms to broader ESG performance metrics without earmarking funds for specific projects. As such, they provide flexibility but pose unique challenges in terms of signaling sustainable commitment (Feldhütter, Halskov, & Krebbers, 2024).

Previous research has studied the effects of announcements of ESG bond issuance on the stock market. For example, Flammer (2021) and Tang and Zhang (2020) found a positive market reaction to the announcement of green bonds. Similarly, Mathew and Sivaprasad (2024) showed a short-term positive reaction following the announcement of sustainability bonds, and Arévalo et al. (2024) reported similar conclusions regarding the

announcement of ESG bond issuance. However, Affolter et al. (2024) could not confirm this positive effect in the case of SLBs.

These studies demonstrate that announcements of ESG bond issuances generally generate positive stock-market reactions due to favorable signaling effects. However, they do not analyze the stock-market impact on the actual date of issuance, which could involve a reassessment of the financial implications and, consequently, a different market response. The issuance date of a bond can trigger significant reactions in the stock market when the detailed terms of the offering, such as the coupon rate or issuance price, are revealed or modified after the announcement (Dann and Mikkelson, 1984; Prokop et al., 2024). Third-party certification is also highly relevant in the issuance of an ESG bond (Fatica and Panzica, 2021), as the impact on the stock market varies depending on whether the bond is certified (Yu et al., 2024). If this information is disclosed or changes after the announcement date (e.g., if the actual purpose of the bond is modified), market behavior will be affected. Moreover, valuable information is disclosed on the issuance date that may have repercussions for stock prices, such as the demand recorded during the placement (whether the full amount was subscribed, not reached, or oversubscribed), the type of investors who purchased the bond (e.g., institutional investors, pension funds, ESG-focused funds), and the reaction of the issuer's conventional bond prices after the ESG bond begins trading in the secondary market.

Therefore, analyzing the market reaction on the effective issuance date of ESG bonds, rather than focusing solely on the announcement date, is crucial, as doing so provides a more direct view of how investors respond when the bonds are placed on the market and companies begin raising capital. Unlike reactions on the announcement date, which are dominated by expectations, more informed reactions based on concrete data can be observed on the issuance date. In addition, the announcement of an ESG bond issuance often generates a positive market response fueled by the novelty of the offering and expectations regarding the financing of sustainable projects. However, on the effective issuance date, the market tends to "readjust" its valuation to bring the price in line with more realistic fundamentals. In this context, this study seeks to unravel the complex interaction between the signaling of corporate sustainability on the announcement date and market efficiency by investigating what happens in the stock market on the effective issuance date.

This study's theoretical framework is based on the efficient market hypothesis (EMH). The EMH posits that financial markets efficiently incorporate all available information into asset prices (Fama, 1970), including the announcement and issuance dates of bonds. For this study, we collected data on ESG bond issuances from 2021 through 2023 from Refinitiv to evaluate the impact of ESG bond issuance on the stock market around the issuance date. This period was pivotal for ESG bonds, as it was shaped by regulatory progress and shifting investor priorities. ESG bonds became tools for addressing critical global challenges and benchmarks for corporate sustainability. To carry out our analysis, we used the event study methodology (Brown & Warner, 1985), which is widely used in studies on ESG bonds (Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020). The sample was composed of 3,618 ESG bond issuances from 957 firms.

Our results show that, around the effective issuance date of ESG bonds, the stock market reacted negatively. Moreover, this reaction was not homogeneous across all types of ESG bonds or for all firms. In particular, we observe a negative effect for issuances aimed at financing specific projects and those carried out by non-financial firms (i.e., less flexibility), while we find no price impact for bonds without a specified purpose or those issued by financial firms (i.e., more flexibility).

This study contributes to the expanding literature on sustainable finance and the EMH. First, we extend previous research on stock-market reactions on the announcement date of ESG bond issuances (Affolter et al., 2024; Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020) by examining the reaction on the effective issuance date. This approach addresses a gap in the literature and reveals a negative stock-market reaction around the issuance date. While ESG bonds imply corporate sustainability commitments, they also raise financial concerns among investors. We demonstrate that the reaction at the time of issuance is a decrease in prices, which could be attributed to a shift from initial optimism during the announcement phase to apprehension at issuance driven by concerns over execution risks and financial obligations.

Second, we contribute to the sustainable finance literature that analyzes the characteristics of ESG bond issuances or issuing companies (Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang) by breaking down the initial analysis based

on the flexibility in the use of funds. Our results show that the market reacts when issuances raise funds for a specific purpose and allocate them to concrete projects (i.e., non-SLBs and non-financial firms). In contrast, we observe no market impact when the use of the funds is more flexible (i.e., SLBs and financial firms), as the funds are minimally committed with fewer restrictions on their use.

4.2. Theoretical background

4.2.1 ESG bonds and stock-market reactions

The emergence of ESG bonds represents a paradigm shift in corporate financing, as it aligns capital allocation with global corporate sustainability objectives. In this context, several types of ESG bonds have emerged, such as green bonds, social bonds, sustainability bonds, and SLBs, which not only provide capital for ESG-related initiatives but also offer financial advantages like lower interest rates due to the positive externalities associated with sustainability (Adekoya et al., 2021). Green bonds are issued to finance projects with clear environmental benefits, such as projects related to renewable energy, energy efficiency, and clean transportation. The proceeds from these bonds are specifically allocated to environmental sustainability initiatives. According to Cunha, Meira, and Orsato (2021), these bonds not only contribute to environmental sustainability but also allow issuers to enhance their market reputation and access more favorable financing conditions. Moreover, as Roggi et al. (2024) highlight, commitment to a sustainable transition helps reduce the cost of capital for future projects.

Social bonds finance projects that have a positive impact on society, such as those focused on affordable housing, healthcare, and education. These bonds have recently gained importance, especially during the COVID-19 pandemic when social inequalities became more evident (Gonzalez-Ruiz, Marín-Rodríguez, & Weber, 2024).

Sustainability bonds combine characteristics of green and social bonds, and allocate their funds to projects with environmental and social benefits, thus promoting comprehensive sustainability efforts that address climate change and social development (Mathew & Sivaprasad, 2024). The growth of these bonds has been significant, as they allow firms to finance a wide range of sustainable projects while attracting a broader investor base than green or social bonds (Schumacher, Chenet, & Volz, 2020).

Unlike green, social, and sustainability bonds, which allocate the proceeds to specific projects, SLBs are linked to the issuer's overall ESG performance. These bonds include performance-based incentives, such as increasing coupons if certain ESG objectives are not met. This type of bond is aligned with ESG goals, and it provides issuers with greater flexibility, and makes a more direct connection between financial results and sustainability objectives (Feldhütter, Halskov, & Krebbers, 2024).

In general terms, the issuance of ESG bonds can act as a signal to the market that a firm is committed to corporate sustainability, which can increase investor confidence and lead to a rise in stock prices. Several studies have shown that the announcement of an ESG bond issuance is usually received positively by the stock market, as it reflects a firm's proactive stance on environmental and social challenges (Arévalo et al., 2024; Schumacher, Chenet, & Volz, 2020). These studies are mainly based on signal theory (Flammer, 2021; Mathew & Sivaprasad, 2024). Signaling theory is a theoretical framework that explains how communication between two parties, often with asymmetrical information, can influence decision-making (Connelly et al., 2011). In this context, one party (the "sender") has access to private information and must decide whether to reveal it through a signal, while the other party (the "receiver") interprets that signal to make more informed decisions (Spence, 1973). Thus, firms that engage in ESG activities do so to signal their long-term commitment to sustainable practices in the hopes of attracting investors concerned about sustainability (Affolter et al., 2024).

Nevertheless, these signals can generate mixed reactions, as some actors may interpret them negatively and impose additional costs on firms (DesJardine, Marti, & Durand, 2021). In fact, the long-term effects on stock prices depend on the firm's ability to meet its ESG objectives. If a firm fails to meet the sustainability objectives associated with its bonds, it could face reputational damage and financial penalties, such as increased coupon payments, which could negatively affect stock prices (Feldhütter, Halskov, & Krebbers, 2024).

4.2.2 Efficient market hypothesis

While some studies have relied on signaling theory to analyze the market impact of ESG bonds, we propose that EMH offers a complementary framework for understanding how

financial markets assimilate these signals. EMH argues that financial markets are information efficient, meaning that stock prices reflect all available information and adjust quickly to any signal from the firm. In an efficient market, investors cannot consistently achieve above-average returns through active management, as prices adjust quickly to any new information (Malkiel, 2003).

Efficiency can take three forms: the weak form in which prices reflect all historical information; the semi-strong form in which prices reflect all publicly available information; and the strong form in which prices also reflect private information (Fama, 1970). A key principle of the EMH is that market participants act rationally and immediately incorporate new information into asset prices.

Event studies often examine how prices react to unexpected news. In an efficient market, any price discrepancies are corrected as soon as the new information is released (Fama, 1998). In the long term, this ensures that abnormal returns (i.e., those that differ from expectations) are neutralized (Fama, 1998). However, some researchers, such as Eberhart and Siddique (2002), have documented long-term price anomalies after financial events, suggesting that markets sometimes underreact or overreact. In the case of ESG bonds, especially green bonds, the EMH has been widely applied (Demirovic, Tucker, & Guermat, 2015; Eberhart and Siddique, 2002), although multifractality and non-linear interactions with other assets complicate price discovery. Hence, EMH remains a useful framework for analyzing how markets assimilate information over time, even in complex contexts such as that of ESG bonds.

4.3. Hypotheses development

4.3.1 The effect of ESG bond issuance on the stock market

In the context of ESG bond issuance, two key moments can be distinguished: the announcement date and the effective issuance date. Studies on market reactions to ESG bond announcements reveal that stock prices tend to increase at the time of the announcement due to investors' perceptions that the firm is committed to long-term sustainability (Arévalo et al., 2024; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020). Tang and Zhang (2020) point out that this type of signal not only improves stock prices and liquidity but also increases the participation of institutional investors, especially in

markets where sustainability is valued as a strategic asset. Arévalo et al. (2024) document that, in the Latin American market, announcements of ESG bond issuances produce an average cumulative abnormal positive return of 2.6% in the event window around the announcement date, which highlights how ESG commitment can reinforce market confidence in the firm.

However, the EMH suggests that any initial positive effect may dissipate on the effective issuance date, as asset prices reflect all publicly available information and any subsequent price change depends on new information (Fama, 1970). In this context, analysts tend to underreact to negative information and overreact to positive information, which influences the adjustment of expectations (Easterwood & Nutt, 1999). In an efficient market, investors quickly adjust their expectations and the stock price adapts to reflect the costs associated with ESG bond issuance. Thus, investors may perceive the issuance as a financial burden for the firm due to the impact on cash flows and the commitment of capital to sustainable projects that might not generate immediate returns. This perception can negatively affect the stock price (Krüger, 2015).

In this regard, Aouadi and Marsat (2018) find that ESG projects, especially those requiring significant financial commitments, can provoke a moderate or even negative market reactions due to the risks associated with meeting sustainability objectives. Similarly, Capelle-Blancard and Petit (2019) show that although the market may initially respond positively to news about ESG factors, negative news tends to have a stronger, longer-lasting impact. Therefore, while the EMH suggests that the market will eventually correct any price misalignment related to ESG signals, the initial market reaction could reflect inefficiencies or uncertainties about the real value of those sustainability signals (Jin et al., 2020). This indicates that although sustainability commitments can generate initial favorable reactions, investor concerns regarding the financial risks associated with such commitments tend to moderate the positive effect over time.

Therefore, we suggest that there is a downward adjustment in the share price on the actual issuance date. This adjustment reflects the real costs and commitments of ESG projects. Therefore, our first hypothesis is the following:

Hypothesis 1. The stock price of the issuing firm decreases on the issuance date of an ESG bond.

4.3.2 The effect of financing specific projects (non-SLBs) on the stock market

According to signaling theory, green, social, and sustainability bonds—all of which allocate their proceeds to specific projects (e.g., renewable-energy initiatives or social infrastructure)—send a clear signal to the market regarding a firm's commitment to sustainability. This reduces information asymmetries and reinforces investor confidence (Mathew & Sivaprasad, 2024). Green bonds, which are used to finance environmental projects such as renewable-energy and resource-efficiency initiatives have proven attractive to investors according to studies in sustainable finance (Muñoz-Torres et al., 2019). Announcements of green bond issuances align with portfolios with sustainability goals, thereby positively impacting the stock prices of the issuing firms (Flammer, 2021; Tang & Zhang, 2020).

Social bonds, which finance projects in areas such as reducing inequalities or promoting social equity and inclusion, have gained in popularity, especially after the COVID-19 pandemic exposed deep social inequalities (Gonzalez-Ruiz et al., 2024). Although the returns on these projects are less tangible than those of green projects and although their immediate price effects are less significant (Carè et al., 2023) due to the complexity of measuring social returns on investments (Gonzalez-Ruiz et al., 2024), they also have an impact on stock prices.

Sustainability bonds, which integrate environmental and social projects, are also perceived as a clear commitment to sustainability. Their announcement triggers a favorable reaction in the stock market and attracts a broader base of investors interested in sustainable finance. Mathew and Sivaprasad (2024) show that the market reacts more positively to sustainability bonds than traditional bonds, and that recurring issuers experience even more favorable reactions because they demonstrate a continuous commitment to environmental and social goals. The combination of environmental and social components reflects a sustainability strategy that addresses both ecological impacts and community well-being, features that are increasingly valued in markets where investors seek alignment with the UN's Sustainable Development Goals (Wang et al., 2024).

In contrast to bonds focused on specific projects, SLBs offer greater flexibility in the use of funds, as they are not linked to concrete projects but rather to general ESG performance

targets (Affolter et al., 2024). Although these bonds feature an incentive component tied to meeting ESG objectives, the absence of specific projects may be perceived as a weaker signal of environmental and social commitment, potentially limiting their impact on stock prices (Vulturius et al., 2024). Affolter et al. (2024) assert that there is no stock-market reaction following announcements of SLB issuances.

Signaling theory holds that bonds intended for specific projects (i.e., green, social, or sustainability) exert a stronger impact on stock prices, as a firm's tangible commitment to concrete initiatives reduces information asymmetries and attracts a wider range of investors (Mathew & Sivaprasad, 2024; Roggi et al., 2024). Multiple studies confirm positive market reactions around the announcement date for decisions to finance specific projects that involve environmental-mitigation or social-improvement efforts (Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020).

However, according to the EMH (Fama, 1970), as the effective issuance date approaches, the market incorporates all available information, and revalues the costs and risks associated with these projects. This adjustment process may temper the initial reaction, and even result in a neutral or negative evaluation if investors perceive high financial commitments or uncertainties in execution. In this way, stock-price volatility can reflect how the market balances the desired sustainable impact against potential short-term profitability pressures. In contrast, SLBs, which do not tie funds to specific projects, send a more diffuse signal of sustainable commitment, and tend to trigger more moderate or even no reactions at the time of announcement (Affolter et al., 2024; Vulturius et al., 2024). In the absence of pronounced positive reactions at the time of announcement, significant corrections on the issuance dates of these bonds are less likely. Consequently, the flexibility in resource use limits visibility regarding their concrete impacts and reduces their signaling power for investors.

Therefore, for bonds financing specific projects, the initial commitment signal is offset on the issuance date, as the market fully incorporates the actual costs and risks, leading to a negative adjustment in the stock price. In contrast, for SLBs, the lack of a concrete allocation of funds minimizes the reaction on the issuance date, as investors do not perceive the same certainty regarding investment outcomes. Therefore, our second hypothesis is the following:

***Hypothesis 2*.** The stock price is more affected on the issuance date of an ESG bond if the issuing firm allocates the raised funds to finance specific projects.

4.3.3 The effect of ESG bond issuances by non-financial firms on the stock market

Descriptions of the use of proceeds and the overall sustainability strategy behind issuing an ESG bond allows for the identification of specific investment projects in the case of non-financial firms. However, for financial firms, participation in the sustainable debt market often involves granting sustainable loans instead of investing directly in sustainable projects (Fatica & Panzica, 2021; Tang & Zhang, 2020).

Previous studies have distinguished between issuers from non-financial and financial sectors with the aim of detecting potential biases in the market (Fatica et al., 2021; Flammer, 2021). The increase in the stock price on a green bond's announcement date is greater after financial firms are excluded, as financial firms invest the proceeds of such bonds in green loans rather than in green projects (Flammer, 2021). The same is true for the negative issuance premium, which materializes only in favor of green bonds issued by non-financial firms. The absence of such a premium for financial firms is attributed to the fact that the bond's green label and, thus, the nature of the underlying project it finances, can be particularly difficult for these issuers to signal given the nature of their businesses (Fatica et al., 2021). In light of these pricing results, one might conclude that the market, in some way, does not value financial firms' environmental efforts.

According to the EMH (Fama, 1970), the market rapidly incorporates all available information into stock prices, so that the impact of the announcement and the reaction on the issuance date largely depend on how clearly the funds' destination can be identified. Financial firms' lower capacity to signal specific projects reduces the visibility of their environmental or social benefits, thereby mitigating any significant variation in stock prices on the issuance date, as no clear link between the ESG bond and sustainable outcomes is perceived. In contrast, for non-financial firms, the relationship between bond issuance and the underlying projects is more direct. Thus, on the issuance date, investors adjust their expectations in light of the real costs and risks involved, which causes a negative reaction in the stock price. As these costs become evident, skepticism about the profitability and effectiveness of these investments grows, which translates into a downward adjustment of the share price. Therefore, our third hypothesis is:

Hypothesis 3. The stock price is more affected on the issuance date of an ESG bond if the issuing firm is non-financial.

Table 4.1 is a summary of the literature used in each of the hypotheses in section 4.3.

Table 4.1. Hypotheses and literature

Hypothesis	Literature
Hypothesis 1. The stock price of the issuing firm decreases on the issuance date of an ESG bond	Aouadi and Marsat, 2018; Arévalo et al., 2024; Capelle-Blancard and Petit, 2019; Fama, 1970; Easterwood & Nutt, 1999; Jin et al., 2020; Krüger, 2015; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020
Hypothesis 2. The stock price is more affected on the issuance date of an ESG bond if the issuing firm allocates the raised funds to finance specific projects	Affolter et al., 2024; Carè et al., 2023; Fama, 1970; Flammer, 2021; Gonzalez-Ruiz et al., 2024; Tang & Zhang, 2020; Mathew & Sivaprasad, 2024; Muñoz-Torres et al., 2019; Roggi et al., 2024; Vulturius et al., 2024; Wang et al., 2024
Hypothesis 3. The stock price is more affected on the issuance date of an ESG bond if the issuing firm is non-financial	Fama, 1970; Fatica & Panzica, 2021; Tang & Zhang, 2020

Source: Own elaboration.

4.4. Methodology

4.4.1 Data collection and sampling

To create our database of corporate ESG bonds, we extracted all ESG bonds from the Refinitiv Eikon database by applying the filters “corporate” and “ESG bond”. We chose to start in 2021 and end in 2023 because this period marks a turning point in the corporate ESG bond market (Table 4.2). Since 2021, transparency and standardization in ESG disclosures have increased owing to the implementation of key regulations like the European Union's Sustainable Finance Disclosure Regulation (SFDR), which has encouraged more firms to issue ESG bonds. The increase in the number of bonds issued in 2021 relative to 2020 was 110% (2,632 versus 1,253) while the amount issued rose by 139% (USD 688.03 billion versus USD 287.95 billion) (Refinitiv Eikon, 2024). By including data through 2023, our study encompasses the most recent information,

allowing us to analyze current trends and capture changes in the stock market's reaction to ESG bond issuances in an evolving economic and regulatory environment. This three-year period is sufficient for identifying significant patterns and provides a solid foundation for evaluating the impact of ESG bonds on the stock market.

Table 4.2. ESG bonds over time (2014-2023)[a]

Year	Number of bonds	$ Amount (billion)
2014	78	14.28
2015	220	29.65
2016	174	67.23
2017	332	95.22
2018	437	110.20
2019	860	229.13
2020	1253	287.95
2021	2632	688.03
2022	2244	576.37
2023	2091	542.56

[a] This table reports the number of ESG bonds issued on an annual basis as well as the total issuance amount (in USD billions) using all ESG bonds issued from 2014 through 2023. Data from Refinitiv Eikon.

The above criteria yielded an initial sample of 6,839 ESG bond issuances in the focal period. As we wished to study the impact on market value, we first checked whether the issuer or its parent firm was publicly traded (Affolter et al., 2024; Tang & Zhang, 2020). If neither the issuer nor the parent firm was listed, we eliminated those issuances, which is a common step in bond-issuance studies (Affolter et al., 2024). In addition, we removed issuances from firms for which the stock market index was not available to us, such as Saudi Arabia or Abu Dhabi, as we needed it for the event study. This left us with a final sample of 3,618 issuances from 957 firms (a firm can issuance several bonds) across 46 indices (i.e., countries) from 2021 through 2023. In Table 4.3, which covers the issuances used in our study, we observe that the 3,618 ESG bond issuances with a total amount issued of USD 1,053.43 billion were divided as follows: 2,223 green bond issuances with

an issued amount of USD 676.2 billion; 286 social-bond issuances with an issued amount of USD 56.32 billion; 704 sustainability-bond issuances with an issued amount of USD 140.08 billion; and 405 SLB issuances with an issued amount of UDS 180.83 billion. Moreover, we obtained the daily stock prices, market index prices, and global index prices (MSCI World Index) from October 1, 2020, to March 31, 2024.

Table 4.3. ESG bonds by type over time (2021-2023)[a]

Year	Type	Number of bonds	$ Amount (billion)
Green bonds	2021	815	228.76
	2022	768	222.02
	2023	640	225.42
	Total	**2223**	**676.2**
Social bonds	2021	91	22.36
	2022	95	17.98
	2023	100	15.98
	Total	**286**	**56.32**
Sustainability bonds	2021	285	74.77
	2022	220	39.24
	2023	199	26.07
	Total	**704**	**140.08**
Sustainability-Linked Bonds (SLBs)	2021	165	85.82
	2022	138	60.17
	2023	102	34.84
	Total	**405**	**180.83**
Total	**ESG**	**3618**	**1053.43**

[a] This table reports the number of ESG bonds issued on an annual basis by type as well as the total issuance amount by type (in USD billions) using all ESG bonds issued from 2021 through 2023. Data from Refinitiv Eikon.

4.4.2 Event study methodology

The event study methodology is widely used in corporate finance research to examine the reaction of stock prices to specific events (Brown & Warner, 1985), such as mergers and acquisitions (MacKinlay, 1997). Furthermore, various studies have adopted this methodology to analyze issues related to ESG (Capelle-Blancard & Petit, 2019; Flammer, 2013) and ESG bonds in particular (Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020). Therefore, we use it to evaluate how the stock market responds to the issuance of ESG bonds, allowing for the possibility that a firm may issue one or multiple bonds of different types on the same day.

In our study, the event date is the issuance date of the ESG bond. In line with Flammer (2021), Krüger (2015) and Mathew and Sivaprasad (2024) we consider the possibility that some information may be known to the public before the issuance and we contemplate the possibility of a lagged response after the issuance. For this reason, our analysis covers event windows of 11 days [-5,5] and 21 days [-10,10] around the issuance date.

To estimate abnormal returns, we use the market model. We estimate the coefficients α_i and β_i of the market model via ordinary least squares (OLS) based on a pre-event estimation period of 90 trading days prior to the event using daily returns.

Formally, we estimate:

$$R_{it} = \alpha_i + \beta_i \times R_{mt} + \varepsilon_{it},$$

where R_{it} is the return on the firm's stock i on day t, R_{mt} is the daily market return, and ε_{it} is the residual. The market returns are specific to each country. In studies that cover multiple international stock markets, we use data from different stock exchanges. Therefore, we employ the market index on which the firm's stock is listed as a reference (Flammer, 2021; Tang & Zhang, 2020).

The estimated return of firm stock i on day t is:

$$\hat{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i \times R_{mt},$$

and the daily abnormal return (AR) of firm i on day t is calculated as follows:

$$AR_{it} = R_{it} - \hat{R}_{it}.$$

Individual abnormal returns are accumulated to determine the cumulative abnormal return (CAR):

$$CAR(t_1,t_2) = t=t_1 \sum t_2 AR_t.$$

CAR measures how much the stock price deviates from its expected value during the event window. In this event study, there are three possible outcomes: a statistically significant and positive CAR, which denotes a positive reaction in stock returns and shows that investors favorably value the issuance of ESG bonds; a statistically significant and negative CAR, which indicates that investors have a negative outlook on the issuer's performance and results in a lower-than-expected return; and a non-significant CAR, which indicates that investors have not reacted to the event.

Subsequently, we employ a t-test to evaluate the statistical significance of the CARs (Brown & Warner, 1985). The t-test is calculated as:

$$t\text{-}test = CAR_T/s(CAR)_T,$$

where $s(CAR_T) = s(AR_T)/(T + 1)^{1/2}$, and $y\ s(AR_T)$ is the variance of the abnormal returns during period T (number of days in the event window).

Finally, in addition to calculating the average abnormal return for each firm, we calculate the cumulative abnormal return of all firms treated as a group following Flammer (2021) and Mathew and Sivaprasad (2024).

4.5. Results

For each hypothesis, we present the results of the event study for the analyzed window intervals: [-5,5] and [-10,10] days. Table 4.4 shows the results for our analysis of the complete sample of all 3,618 ESG bond issuances. The CARs for these issuances in the two event windows are negative and significant at -0.3821 with a significance level of 0.1% and -0.5568 with a significance level of 0.1%, respectively. These results indicate that the stock market responds negatively around the issuance date of ESG bonds, so we can accept Hypothesis 1.

Table 4.4. The effect of ESG bond issuance on the stock market

Event window	CAR	Robust Std. err.	t-statistic
[-5,5] (ESG)	-0.3821***	0.1023	-3.73
[-10,10] (ESG)	-0.5568***	0.1508	-3.69

[a] This table reports the CARs for different time windows around the date of ESG bond issuances. The sample consists of 3,618 ESG bond-issuance events. CARs are calculated with country-specific market indices. Significance levels: †.10; *.05; **.01; ***.001.

Table 4.5 shows the results corresponding to Hypothesis 2, which compares the stock market's reactions to issuances of bonds aimed at financing specific projects (non-SLBs) and non-specific projects (SLBs). The sample consists of 3,213 non-SLB issuances and 405 SLB issuances. The CARs for non-SLB issuances in the two event windows are negative and significant at -0.3386 with a significance level of 1% and -0.6310 with a significance level of 0.1%, respectively. However, the CARs for SLB issuances are not significant for the two event windows. These results support Hypothesis 2, which states that if the funds are allocated to specific projects, the stock price will be affected on the issuance date.

Table 4.5. The effect of non-SLB and SLB issuance on the stock market[a]

Event window	CAR	Robust Std. err.	t-statistic
[-5,5] (Non-SLBs)	-0.3386**	0.1026	-3.30
[-10,10] (Non-SLBs)	-0.6310***	0.1552	-4.07
[-5,5] (SLBs)	0.2902	0.2739	1.06
[-10,10] (SLBs)	0.2604	0.4560	0.57

[a] This table reports the CARs for different time windows around the date of non-SLB and SLB issuances. The sample consists of 3,213 non-SLB and 405 SLB issuance events. CARs are calculated with country-specific market indices. Significance levels: †.10; *.05; **.01; ***.001.

Table 4.6 shows the results for Hypothesis 3, which compares the stock market's reactions to issuances of ESG bonds by non-financial and financial firms. The sample consists of 2,694 ESG bond-issuance events by non-financial firms and 924 by financial firms. The CARs for non-financial firms in the two event windows are negative and

significant at -0.2678 with a significance level of 5% and -0.5547 with a significance level of 1%, respectively. However, the CARs for financial firms are not significant for the two event windows. These results support Hypothesis 3, which states that there is an impact on the stock price on the issuance date if the issuance is from a non-financial firm.

Table 4.6. The effect of ESG bond issuance by non-financial and financial firms on the stock market[a]

Event window	CAR	Robust Std. err.	t-statistic
[-5,5] Non-Financial	-0.2678*	0.1093	-2.45
[-10,10] Non-Financial	-0.5547**	0.1673	-3.32
[-5,5] Financial	-0.2688	0.2010	-1.34
[-10,10] Financial	-0.4612	0.3066	-1.50

[a] This table reports the CARs for different time windows around the date of ESG bond issuances by non-financial and financial firms. The sample consists of 2,694 ESG bond-issuance events by non-financial firms and 924 by financial firms. CARs are calculated with country-specific market indices. Significance levels: †.10; *.05; **.01; ***.001.

4.5.1 Robustness Tests

We also we assess the robustness of our findings. First, following Flammer (2021), we evaluate the robustness of our findings by considering event windows of 10 days [-20,-11] and 15 days [-25,-11] prior to the event windows of our analysis with the aim of detecting possible trends before the event date. In Table 4.7, we present the results, none which are significant. These findings indicate that there were no trends in the days preceding the events.

Table 4.7. Robustness tests 1[a]

Bonds/Corporations	CAR [-20,-11]	CAR [-25,-11]
ESG	-0.1276	-0.0980
Non-SLBs	-0.1496	-0.1172
SLBs	0.0973	-0.3889
Non-Financial	-0.1702	-0.2098
Financial	-0.0658	0.0361

[a] This table reports the CARs for different time windows around the date of ESG bond, non-SLB, and SLB issuances. It also reports the CARs for different time windows around the date of ESG bond issuances by non-financial and financial firms. The sample consists of 3,618 ESG bond, 3,213 non-SLB, and 405 SLB issuance events. It also consists of 2,694 ESG bond-issuance events by non-financial firms and 924 by financial firms. CARs are calculated with country-specific market indices. Significance levels: †.10; *.05; **.01; ***.001.

Second, we use the MSCI World index instead of country-specific market indices to calculate the CAR. The MSCI World is an equity index that includes large- and mid-cap firms from 23 developed markets. It covers approximately 85% of the free-float-adjusted market capitalization of these countries, and is widely used as a benchmark in financial research due to its ability to provide a global, diversified perspective of the equity market. This index is also recognized in studies on sustainability bonds (Mathew & Sivaprasad, 2024) and SLBs (Affolter et al., 2024), which ensures the comparability of our results with the extant literature. Table 4.8, which presents the results obtained using this alternative benchmark, shows outcomes similar to those of our main analysis. This reinforces the validity of the findings and suggests that our conclusions are robust even under different methodological approaches.

Table 4.8. Robustness tests 2[a]

Bonds/Corporations	CAR [-5,5]	CAR [-10,10]
ESG	-0.6353***	-0.8747***
Non-SLBs	-0.7305***	-0.9999***
SLBs	0.1184	0.1177
Non-Financial	-0.5284***	-0.9429***
Financial	-0.3954	-0.7317†

[a] This table reports the CARs for different time windows around the date of ESG bonds, non-SLB, and SLB issuances. It also reports the CARs for different time windows around the date of ESG bond issuances by non-financial and financial firms. The sample consists of 3,618 ESG bond, 3,213 non-SLB, and 405 SLB issuance events. It also consists of 2,694 ESG bond-issuance events by non-financial firms and 924 by financial firms. CARs are calculated with the MSCI World Index. Significance levels: †.10; *.05; **.01; ***.001.

4.6. Discussion

ESG bonds have become a vital tool for firms seeking to improve their sustainability profiles while obtaining financial benefits. They help firms finance projects that contribute to environmental and social objectives while attracting a growing investor base focused on responsible investments. In this context, this study provides key insights into the stock market's reaction to the issuance of ESG bonds. Analyses of these reactions on the effective dates of issuances allow us to capture the real and tangible impacts of ESG bonds on the market, and provide more accurate information on their influence on stock market and investors' perceptions. Our findings consistently reveal a negative CAR around the issuance date, which suggests that investors reconsider the financial implications of sustainability commitments at that crucial moment. This supports the EMH, which posits that markets quickly and accurately incorporate available information into asset prices (Fama, 1970, 1998). Furthermore, the different market reactions to the use of funds highlight the complexity involved in investors' valuations of sustainability initiatives.

The issuance of ESG bonds constitutes a key signal of corporate commitment to sustainability and aligns with the signaling theory's approach to reducing information asymmetries (Connelly et al., 2011; Spence, 1973). However, while the initial

announcement of these bonds may generate a positive market response (Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020), our results show that the actual issuance triggers deeper scrutiny from investors. The observed negative CAR indicates that investors weigh the costs and risks associated with meeting sustainability objectives, which may be perceived as a financial commitment that puts pressure on the firm's resources (Capelle-Blancard & Petit, 2019; Krüger, 2015). In this regard, investors might interpret these issuances as a financial commitment that diverts resources from core operations to projects with uncertain short-term profitability. This heightens concerns about financial viability and the firm's ability to effectively meet sustainability expectations, ultimately leading to a negative market reaction.

To analyze this effect in detail, we separate the bond issuances based on the flexibility of their fund usage. First, we differentiate by bond type. In bond issuances, the funds are allocated to specific projects (i.e., non-SLBs: green, social, and sustainability bonds), making the use of those funds less flexible. In SLB issuances, the allocation of funds is more flexible. Our comparison of these two categories shows clear differences in their impacts on the stock market. Non-SLBs exhibit a significantly negative CAR across all event windows, reflecting investors' sensitivity to environmental and social commitments due to the clarity and tangibility of these bonds' objectives (Cunha, Meira, & Orsato, 2021; Muñoz-Torres et al., 2019). However, in the case of SLBs, the results are not significant, suggesting that their flexibility and the lack of specific targets for the funds limit their ability to generate a defined market reaction. Although SLBs allow adaptation to different ESG objectives, the absence of a specific focus may weaken their effectiveness as a sustainability signal (Vulturius et al., 2024).

Second, we differentiate based on the issuing firm. Non-financial firms allocate funds obtained from an issuance directly to their own projects, which implies a less flexible use of resources. In contrast, financial firms typically use these funds to grant loans for sustainable purposes, allowing them greater flexibility in fund utilization (Fatica et al., 2021). Similar to the previous case, the comparison between these two types of firms reveals clear differences in their impacts on the stock market. For non-financial firms, the results show a significant negative CAR across all event windows. This suggests that although ESG bond issuances by non-financial firms send strong signals of corporate responsibility (Mathew & Sivaprasad, 2024), they also raise concerns about execution

risks and financial viability. However, the results for ESG bond issuances by financial firms are not significant, which may be attributed to the uncertainty regarding the allocation of their funds. While ESG bonds issued by financial firms represent a significant portion of the corporate ESG bond market, investors generally still perceive them as more opaque than ESG bonds issued by non-financial firms. This is due to the former's lower level of detail regarding the allocation of proceeds and the greater complexity in monitoring the issuing financial firms (Bedendo, Nocera, & Siming, 2023). To build market confidence, firms must support their issuances with clear commitments and transparent objectives.

4.7. Conclusions, limitations, and future research

Our study analyzes the stock market's reactions to the issuance of ESG bonds, and provides empirical evidence on the dynamics between sustainable finance and investor behavior. It makes several contributions. First, building on research that examines the stock market's reactions on the announcement dates of ESG bond issuances of various types (Affolter et al., 2024; Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020), we analyze the stock market's reaction on the effective issuance date. Our findings highlight a negative and significant CAR around the issuance date of ESG bonds, which confirms that while these instruments symbolize corporate commitment to sustainability, they also generate concerns among investors about their financial implications. By incorporating the EMH, we contribute to the interaction between signaling theory and the EMH, where initial optimism in the announcement phase is tempered by execution risks and financial commitments at the time of issuance. While signals of sustainable commitment positively influence investors' expectations during the announcement phase (Arévalo et al., 2024; Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020), the market's subsequent efficiency in incorporating these signals reduces their impact on long-term share-price.

Although previous studies have analyzed different characteristics of firms and ESG bond issuances, such as first-time versus repeat issuers (Flammer, 2021; Tang & Zhang, 2020), multiple versus single issuances (Mathew & Sivaprasad, 2024), and board diversity (Arévalo et al., 2024), this study contributes to the sustainable finance literature by examining the stock-market effect of ESG bond issuances based on the flexibility of the

use of the raised funds. The results show that market reactions vary significantly depending on the flexibility of the funds' usage. When the use of funds is less flexible, such as in non-SLB issuances and in issuances by non-financial firms, our results indicate an impact on the stock market. However, no stock-market impact is observed when flexibility is greater, as in the case of SLBs and issuances by financial firms due to the difficulty of controlling outcomes in sustainable improvements.

Furthermore, our results underscore the need for robust signaling strategies and strong transparency in order to align corporate sustainability objectives with market expectations. From a practical perspective, these conclusions offer valuable guidelines for firms, investors, and policymakers interested in promoting sustainable financial practices. For firms, it is essential to implement effective governance mechanisms, clearly communicate the use of the raised funds, and demonstrate tangible results. Policymakers should work on creating standardized metrics and regulatory frameworks that reinforce market confidence in ESG initiatives.

Despite its contributions, this study suffers from several limitations that should be addressed in future research. First, our sample was limited to ESG bond issuances from 2021 through 2023, a period characterized by intensified regulatory focus and economic volatility. Although this time frame captures relevant trends, a longer-term analysis could provide a deeper understanding of changing investor perceptions and market dynamics. Second, our study relied on CAR as a measure of the market's reaction. CAR captures short-term impacts on share-price but may overlook long-term effects. Future research could complement this approach with longitudinal analyses to assess the sustainability of stock-price adjustments after ESG bond issuance. Third, our analysis focused on corporate ESG bonds, and excluded issuances by governments or supranational entities. An expansion of the scope to include these actors could offer a broader view of the role of ESG bonds in driving sustainable finance. Finally, we did not consider industry-specific factors that may influence market reactions (we only separated non-financial firms from financial firms). For example, industries with higher environmental or social risks could be examined separately, as they might experience different market responses to the issuance of ESG bonds. Future studies should explore how sector-specific characteristics interact with ESG signaling and share-price.

Based on our findings, future research could explore several areas. One promising direction would be to examine the impact of regional differences on market reactions to ESG bond issuance. Variations in regulatory environments, investors' preferences, and cultural attitudes toward sustainability could influence stock-market behavior in different regions. Another area of interest is the long-term performance of firms after issuance. Studies could investigate whether firms that meet or exceed their stated ESG objectives experience better financial outcomes than those that do not. This line of research could provide valuable insights into the credibility and effectiveness of ESG commitments as drivers of market value. Finally, investigations of the interactions between ESG bonds and other financial instruments, such as green loans or ESG-linked derivatives, could shed light on the broader ecosystem of sustainable finance. The integration of these perspectives would offer a more comprehensive view of how financial innovation supports the transition toward sustainability.

References

Adekoya, O. B., Oliyide, J. A., Asl, M. G., & Jalalifar, S. (2021). Financing the green projects: Market efficiency and volatility persistence of green versus conventional bonds, and the comparative effects of health and financial crises. *International Review of Financial Analysis*, *78*, 101954.

Affolter, B., Ciarla, E., Meyer, J., & Sugandhita, S. (2024). Signaling sustainability: Differential reaction of the stock market following the announcement of sustainability-linked bonds. *Finance Research Letters*, *63*, 105261.

Arévalo, G., González, M., Guzmán, A., & Trujillo, M. A. (2024). The value effect of sustainability: evidence from Latin American ESG bond market. *Journal of Sustainable Finance & Investment*, 1-22.

Aouadi, A., & Marsat, S. (2018). Do ESG controversies matter for corporation value? Evidence from international data. *Journal of Business Ethics 151*, 1027-1047.

Ashwin Kumar, N. C., Smith, C., Badis, L., Wang, N., Ambrosy, P., & Tavares, R. (2016). ESG factors and risk-adjusted performance: a new quantitative model. *Journal of sustainable finance & investment*, *6*(4), 292-300.

Bedendo, M., Nocera, G., & Siming, L. (2023). Greening the financial sector: Evidence from bank green bonds. *Journal of Business Ethics*, *188*(2), 259-279.

Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*, *14*(1), 3-31.

Capelle-Blancard, G., & Petit, A. (2019). Every little helps? ESG news and stock market reaction. *Journal of Business Ethics*, *157*, 543-565.

Carè, R., Carè, S., Lévy, N., & Fatima, R. (2023). Missing finance in social impact bond research? A bibliometric overview between past and future research. *Corporate Social Responsibility and Environmental Management*, *30*(5), 2101-2120.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, *37*(1), 39-67.

Cunha, F. A. F. D. S., Meira, E., & Orsato, R. J. (2021). Sustainable finance and investment: Review and research agenda. *Business Strategy and the Environment*, *30*(8), 3821-3838.

Dann, L. Y., & Mikkelson, W. H. (1984). Convertible debt issuance, capital structure change and financing-related information: Some new evidence. *Journal of Financial Economics*, *13*(2), 157-186.

Demirovic, A., Tucker, J., & Guermat, C. (2015). Accounting data and the credit spread: An empirical investigation. *Research in International Business and Finance*, *34*, 233-250.

DesJardine, M. R., Marti, E., & Durand, R. (2021). Why activist hedge funds target socially responsible corporations: The reaction costs of signaling corporate social responsibility. *Academy of Management Journal*, *64*(3), 851-872.

Di Marco, R., Dong, T., Malatincová, R., Reuter, M., & Strömsten, T. (2023). Symbol or substance? Scrutinizing the 'risk transparency premise'in marketized sustainable finance: The case of TCFD reporting. *Business Strategy and the Environment*, *32*(6), 3027-3052.

Eberhart, A. C., & Siddique, A. (2002). The long-term performance of corporate bonds (and stocks) following seasoned equity offerings. *Review of Financial Studies*, *15*(5), 1385-1406.

Eccles, N. S., and S. Viviers. (2011). The origins and meanings of names describing investment practices that integrate a consideration of ESG issues in the academic literature. *Journal of Business Ethics* 104, 389-402.

Easterwood, J. C., & Nutt, S. R. (1999). Inefficiency in analysts' earnings forecasts: Systematic misreaction or systematic optimism? *The Journal of Finance*, *54*(5), 1777-1797.

Environmental Finance. (2024). Database Environmental Finance. Accessed 25 June 2024

Fama, E. F. (1970). Efficient capital markets. *Journal of Finance*, *25*(2), 383-417.

Fama, E. F. (1991). Efficient capital markets: II. *Journal of Finance*, *46*(5), 1575-1617.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics*, *49*(3), 283-306.

Flammer, C. (2013). Corporate social responsibility and shareholder reaction: The environmental awareness of investors. *Academy of Management Journal*, *56*(3), 758-781.

Flammer, C. (2021). Corporate green bonds. *Journal of Financial Economics*, *142*(2), 499-516.

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change?. *Business Strategy and the Environment*, *30*(5), 2688-2701.

Fatica, S., Panzica, R., & Rancan, M. (2021). The pricing of green bonds: are financial institutions special?. *Journal of Financial Stability*, *54*, 100873.

Feldhütter, P., Halskov, K., & Krebbers, A. (2024). Pricing of sustainability-linked bonds. *Journal of Financial Economics*, *162*, 103944.

Gonzalez-Ruiz, J. D., Marín-Rodríguez, N. J., & Weber, O. (2024). New insights on social finance research in the sustainable development context. *Business Strategy & Development*, *7*(1), e342.

Jin, Y., Cheng, C., & Zeng, H. (2020). Is evil rewarded with evil? The market penalty effect of corporate environmentally irresponsible events. *Business Strategy and the Environment*, *29*(3), 846-871.

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, *115*(2), 304-329.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, *35*(1), 13-39.

Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, *17*(1), 59-82.

Mathew, S., & Sivaprasad, S. (2024). An empirical analysis of corporate sustainability bonds. *Business Strategy and the Environment*, *33*(4), 3299-3316.

Muñoz-Torres, M. J., Fernández-Izquierdo, M. Á., Rivera-Lirio, J. M., & Escrig-Olmedo, E. (2019). Can environmental, social, and governance rating agencies favor business models that promote a more sustainable development? *Corporate Social Responsibility and Environmental Management*, *26*(2), 439-452.

Prokop, J., Walting, M., & Kahlen, F. (2024). Are more analysts better? The case of convertible bond announcement effects. *International Review of Financial Analysis*, *96*, 103696.

Refinitiv Eikon. (2024). *Financial database refinitiv*. Accessed 30 June 2024.

Roggi, O., Bellardini, L., & Conticelli, S. (2024). Effects of ESG performance and sustainability disclosure on GSS bonds' yields and spreads: A global analysis. *Finance Research Letters*, *68*, 105988.

Schumacher, K., Chenet, H., & Volz, U. (2020). Sustainable finance in Japan. *Journal of Sustainable Finance & Investment*, *10*(2), 213-246.

Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics*, *87*: 355-374.

Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance*, *61*, 101427.

Vulturius, G., Maltais, A., & Forsbacka, K. (2024). Sustainability-linked bonds–their potential to promote issuers' transition to net-zero emissions and future research directions. *Journal of Sustainable Finance & Investment*, *14*(1), 116-127.

Wang, S., Chen, S. C., Ali, M. H., & Tseng, M. L. (2024). Nexus of environmental, social, and governance performance in China-listed corporations: Disclosure and green bond issuance. *Business Strategy and the Environment*, *33*(3), 1647-1660.

Yu, Q., Hui, E. C. M., & Shen, J. (2024). The real impacts of third-party certification on green bond issuances: Evidence from the Chinese green bond market. *Journal of Corporate Finance*, *89*, 102694.

CAPÍTULO 5:

CONCLUSIONES E IMPLICACIONES

5.1. Introducción

La presente tesis doctoral se estructura en cinco capítulos. En el primer capítulo se establecen el marco conceptual y los objetivos del trabajo, además de ofrecer un estudio y análisis detallado sobre la evolución de las finanzas sostenibles y la relevancia de los bonos ESG en el ámbito corporativo. En este capítulo también se exponen los antecedentes teóricos y empíricos que sustentan la investigación, proporcionando una base sólida para comprender la importancia de los bonos ESG dentro de las finanzas sostenibles y su impacto en la gestión empresarial.

Por su parte, los capítulos 2, 3 y 4 se dedican al análisis de diversos aspectos clave del tema abordado. El Capítulo 2 examina el efecto de la emisión de bonos verdes sobre el desempeño medioambiental de las empresas emisoras, profundizando en cómo la emisión de estos bonos puede funcionar como un mecanismo para centrar la atención en cuestiones medioambientales. De este estudio se desprende que la emisión de dichos instrumentos financieros no garantiza automáticamente mejoras medioambientales, sino que su eficacia depende tanto de la intensidad del bono como de ciertas condiciones internas de la empresa. A continuación, el Capítulo 3 investiga los bonos ESG como señales para la mejora reputacional, mostrando cómo su emisión puede mitigar riesgos reputacionales y mejorar la percepción de la empresa por parte de los grupos de interés, sobre todo cuando los costes de la señal son elevados. Finalmente, el Capítulo 4 analiza la reacción del mercado bursátil en torno a la fecha efectiva de emisión de bonos ESG, evidenciando reacciones negativas que se acentúan cuando la flexibilidad en el uso de los fondos es menor (bonos no SLBs y emitidos por empresas no financieras).

Por último, el Capítulo 5 presenta las principales conclusiones y contribuciones derivadas de los capítulos anteriores. En esta sección final se debaten las implicaciones teóricas y prácticas de los estudios llevados a cabo, se señalan las limitaciones de la investigación y se proponen posibles líneas de trabajo futuro.

5.2. Conclusiones e implicaciones teóricas del trabajo de investigación

Las conclusiones de la presente tesis doctoral, expuestas a continuación, contribuyen a profundizar en la comprensión de las repercusiones que la emisión de bonos ESG tiene para las empresas emisoras.

Los resultados del Capítulo 2 arrojan luz sobre la relevancia de los bonos verdes como mecanismo para promover mejoras en el desempeño medioambiental, mediante la canalización de la atención de los directivos hacía toda la organización por temas medioambientales. Aunque la simple emisión de un bono verde no garantiza por sí sola un cambio significativo en dicho desempeño, el capítulo demuestra que la intensidad de la emisión, así como determinadas condiciones internas, como el crecimiento, la rentabilidad y el endeudamiento, son factores determinantes para convertir estos instrumentos financieros en auténticas palancas de transformación. Asimismo, se subraya la importancia de que los diferentes niveles directivos, desde la alta gerencia hasta las áreas operativas, se encuentren alineados y sensibilizados respecto de la relevancia estratégica de la sostenibilidad, de modo que se puedan materializar acciones concretas que impulsen el desempeño medioambiental a largo plazo.

Las principales contribuciones teóricas de este capítulo son las siguientes:

En primer lugar, contribuye a la literatura sobre finanzas sostenibles al aportar nuevas evidencias sobre el impacto de los bonos verdes en la mejora del desempeño medioambiental de las empresas (Benlemlih et al., 2023). Si bien estudios previos habían sugerido la existencia de un vínculo entre la emisión de este tipo de instrumentos y el desempeño medioambiental (Flammer, 2021), nuestros hallazgos matizan que no todas las organizaciones emiten bonos verdes con la misma efectividad. En este sentido, la "intensidad" de la emisión, medida por el tamaño relativo del bono, desempeña un papel relevante en la canalización de la atención de los directivos hacia políticas y prácticas medioambientales más ambiciosas.

En segundo lugar, contribuye a la literatura sobre finanzas sostenibles que analiza diferentes características de las emisiones de bonos verdes (Fatica & Panzica, 2021), al desglosar el análisis de acuerdo con factores internos de la empresa como el crecimiento, la rentabilidad y el endeudamiento. Los resultados indican que, en contextos de crecimiento, las empresas pueden dedicar más recursos (tanto humanos como financieros) a la adopción de medidas sostenibles, logrando mayores avances en indicadores medioambientales. Asimismo, cuando la empresa presenta una mejora en su rentabilidad, dispone de un excedente invertible en innovaciones medioambientales, mientras que el

endeudamiento adicional proporciona acceso a capital externo para emprender proyectos que requieran inversiones más intensivas.

En tercer lugar, contribuye a la literatura sobre la teoría de la ABV (Ocasio, 1997; Ocasio, 2011) al demostrar cómo la emisión de un bono verde, bajo determinadas condiciones, funciona como un mecanismo que canaliza la atención de la alta dirección y de los mandos intermedios hacia objetivos de sostenibilidad por todos los miembros de la organización. Desde esta perspectiva, la forma en que la empresa distribuye su atención en iniciativas medioambientales es determinante para convertir la financiación verde en acciones concretas de mejora medioambiental. Sin embargo, esta atención no siempre se traduce en cambios efectivos: resulta imprescindible un entorno propicio, recursos suficientes y una visión estratégica clara para que la emisión de bonos verdes genere un impacto real en el desempeño medioambiental de la empresa.

Los resultados del Capítulo 3 permiten comprender la efectividad de los bonos ESG como señal creíble (observable y costosa) para mejorar la reputación corporativa y mitigar el riesgo reputacional, distinguiendo las percepciones de los accionistas y de otros grupos de interés. Se demuestra que la emisión de estos instrumentos financieros, caracterizados por su coste (tanto monetario como no monetario) y visibilidad, fomenta una percepción más positiva por parte de las partes interesadas. No obstante, el capítulo señala que este impacto no es uniforme y depende de factores contextuales. Por ejemplo, las empresas líderes en sostenibilidad experimentan un refuerzo más intenso de su reputación y una reducción más efectiva del riesgo reputacional, mientras que aquellas con un perfil más débil pueden incluso sufrir un efecto adverso. Esto se debe a que, para las primeras, el "coste penalizador de pérdida de reputación" de no cumplir las altas expectativas es mayor, lo cual refuerza la credibilidad de su compromiso corporativo. En contraste, las empresas rezagadas en materia de sostenibilidad se enfrentan a la posibilidad de que su emisión de bonos sea percibida como greenwashing o wokewashing, lo que suscita escepticismo entre los grupos de interés. Asimismo, se evidencia que los costes de endeudamiento ejercen un rol moderador: si bien un mayor coste de la deuda fortalece la reputación al considerarse un compromiso monetario relevante con la sostenibilidad, no necesariamente reduce el riesgo percibido por los accionistas, quienes podrían interpretarlo como un incremento en la probabilidad de incumplimiento.

Las principales contribuciones teóricas de este capítulo son las siguientes:

En primer lugar, contribuye a la literatura sobre finanzas sostenibles (Flammer, 2021; Larcker & Watts, 2020; Tang & Zhang, 2020) al demostrar que la emisión de bonos ESG mejora la reputación corporativa y reduce el riesgo reputacional, ofreciendo así una explicación alternativa para la emisión de estos instrumentos. El estudio destaca que las empresas pueden optar por esta vía no solo en busca de eventuales beneficios financieros o de sostenibilidad, sino también para consolidar su imagen ante accionistas y otras partes interesadas. Si bien investigaciones anteriores habían resaltado los efectos reputacionales de los bonos verdes para impulsar la innovación colaborativa (Lian et al., 2023), este trabajo extiende tal planteamiento al considerar los bonos ESG como una señal deliberada para obtener beneficios reputacionales.

En segundo lugar, contribuye a la teoría de la señal (Bergh et al., 2014; Connelly et al., 2011; Spence, 1973) al evidenciar que los bonos ESG operan como una manifestación del compromiso corporativo con la sostenibilidad, pero no en todos los contextos. Dos escenarios resultan particularmente relevantes. Primero, el desempeño previo en sostenibilidad: las empresas que ya eran líderes refuerzan su reputación y reducen más eficazmente su riesgo reputacional, en tanto que aquellas con un historial más débil generan sospechas de greenwashing y se ven sometidas a una atención más crítica. Segundo, el coste de la deuda: para otras partes interesadas, que la empresa asuma mayores costes de la deuda fortalece la credibilidad de la señal, ya que demuestra su voluntad de invertir seriamente en proyectos ESG. Sin embargo, en situaciones de alta incertidumbre financiera, el riesgo percibido por los accionistas puede obstaculizar la disminución del riesgo reputacional.

En tercer lugar, contribuye a la teoría de la señal al poner de relieve que distintas audiencias interpretan de forma diferente una misma señal (DesJardine et al., 2021; Park & Patel, 2015). Mientras que los accionistas suelen valorar positivamente la reducción del riesgo reputacional si la empresa logra resultados tangibles en el corto plazo, otras partes interesadas pueden otorgar más importancia al impacto a largo plazo en la mejora de la reputación corporativa. Este hallazgo resalta la necesidad de una gestión estratégica que reconozca la naturaleza multidimensional de los bonos ESG, de modo que las

empresas puedan equilibrar objetivos financieros y expectativas de sostenibilidad de forma simultánea.

Los resultados del Capítulo 4 permiten comprender la compleja interacción entre las finanzas sostenibles y el comportamiento de los accionistas ante la emisión de bonos ESG. En particular, se demuestra que el mercado bursátil reacciona de forma negativa en torno a la fecha efectiva de emisión, lo que sugiere que los accionistas, aunque inicialmente puedan percibir de forma positiva el anuncio de la emisión ESG, posteriormente ajustan sus valoraciones al incorporar con mayor exactitud los riesgos y costes vinculados a los compromisos de sostenibilidad. Esta reacción negativa coincide con la EMH, evidenciando que, una vez se divulga información más pormenorizada acerca de las características financieras y de las condiciones de la emisión, el optimismo inicial puede verse atenuado por las expectativas de costes presentes y futuros.

Las principales contribuciones teóricas de este capítulo son las siguientes:

En primer lugar, contribuye a la literatura sobre finanzas sostenibles al ampliar los trabajos previos que estudian la reacción del mercado bursátil en la fecha de anuncio de las emisiones de bonos ESG (Flammer, 2021; Mathew & Sivaprasad, 2024; Tang & Zhang, 2020), incorporando el análisis de la reacción en la fecha efectiva de emisión. Este enfoque llena un vacío en la literatura al evidenciar una reacción negativa del mercado en torno a la fecha efectiva de emisión, lo cual indica que la respuesta de los accionistas cambia de manera sustancial cuando el capital se hace efectivo y se conocen los detalles específicos de la operación. Con ello se demuestra que el entusiasmo inicial por los proyectos ESG se ve moderado por las inquietudes sobre viabilidad financiera y ejecución.

En segundo lugar, contribuye a la literatura sobre finanzas sostenibles que analiza diferentes características de las emisiones de bonos ESG o de las empresas emisoras (Arévalo et al., 2024; Fatica & Panzica, 2021; Flammer, 2021;) al desglosar el estudio en función de la flexibilidad en el uso de los fondos. El hecho de que las emisiones destinadas a proyectos específicos (bonos verdes, sociales o sostenibles) provoquen un mayor ajuste negativo que aquellas con un uso de fondos más flexible (bonos vinculados a la sostenibilidad) refuerza la idea de que una asignación detallada, aunque supone una señal

positiva en el momento del anuncio, también expone al emisor a un mayor escrutinio y preocupación en torno a la rentabilidad y los riesgos operativos a largo plazo.

En tercer lugar, se contribuye a la teoría de la EMH (Fama, 1970; Malkiel, 2003) al recalcar cómo el mercado asimila de manera progresiva la información relacionada con los compromisos de sostenibilidad, ajustando finalmente su valoración cuando la emisión se materializa. Este hallazgo pone de relieve que la difusión de noticias ESG no solo genera reacciones inmediatas, sino que el mercado sigue realizando ajustes a medida que los accionistas obtienen información más completa sobre los costes reales y la estructura financiera de los bonos ESG. De esta forma, se profundiza en la comprensión del funcionamiento de los mercados eficientes, mostrando cómo las señales de sostenibilidad pueden tener efectos diferenciados y cómo el mercado valora, con una perspectiva más realista, los compromisos asumidos en materia medioambiental y social una vez que el instrumento financiero entra en circulación.

Con todo ello, podemos concluir que la presente tesis doctoral realiza importantes contribuciones a la literatura sobre finanzas sostenibles, la teoría de la ABV, la teoría de la señal y la EMH. En primer lugar, contribuye a la literatura sobre finanzas sostenibles al demostrar cómo la emisión de bonos verdes impulsa el desempeño medioambiental, subrayar la relevancia de factores internos (crecimiento, rentabilidad y endeudamiento); evidenciar que la emisión de bonos ESG refuerza la reputación corporativa y mitiga el riesgo reputacional; poner de manifiesto la importancia de un sólido historial de sostenibilidad para maximizar estos efectos positivos y, finalmente, destacar la reacción negativa del mercado cuando se concreta la emisión, lo que atenúa el optimismo inicial. En segundo lugar, contribuye a la teoría de la ABV al evidenciar cómo la emisión de bonos verdes canaliza la atención de la alta dirección y de los mandos intermedios hacia objetivos de sostenibilidad, requiriendo un entorno y recursos adecuados para que dicha atención se traduzca en mejoras reales. En tercer lugar, se contribuye a la teoría de la señal al mostrar que los bonos ESG actúan como compromisos creíbles, con efectos reputacionales diversos según el historial de calificaciones sostenibles de la empresa y el coste asumido, y que distintas audiencias interpretan la misma señal de manera diferenciada. En cuarto lugar, se contribuye a la EMH al demostrar cómo el mercado asimila de forma progresiva la información sobre sostenibilidad, reflejando una reacción negativa en la fecha efectiva de emisión que modera el entusiasmo inicial.

5.2.1. Integración de los marcos teóricos: ABV, teoría de la señal y EMH

La combinación de la ABV, la teoría de la señal y la EMH permite describir el ciclo completo de un bono ESG desde su gestación interna hasta su valoración definitiva en los mercados. La ABV explica cómo aquello a lo que la alta dirección atiende guía la asignación de recursos. En el plano intra-organizativo, la primera emisión de un bono ESG o las presiones regulatorias, competitivas o reputacionales redirigen la atención de la alta dirección y la canalizan al resto de la organización hacia cuestiones sostenibles, convirtiendo los bonos ESG en un vehículo para alinear la estrategia financiera con objetivos sostenibles concretos. Indicadores de desempeño, por ejemplo, la reducción de emisiones o los ratios de igualdad de género, cristalizan esa atención en metas verificables y medibles, de modo que la decisión de emitir no constituye un acto aislado, sino el resultado de un proceso cognitivo sistemático de priorización estratégica y despliegue de recursos dentro de la organización.

Una vez adoptada la decisión, la emisión se proyecta al exterior que, siguiendo a la teoría de la señal, se convierte en una señal observable que reduce la asimetría informativa entre la empresa y sus grupos de interés: inversores, reguladores y sociedad en general. Elementos como certificaciones independientes, criterios de elegibilidad explícitos y la posibilidad de perder la etiqueta “verde” introducen costes potenciales que refuerzan la credibilidad del compromiso, diferenciando a las empresas auténticamente sostenibles de aquellas susceptibles de incurrir en prácticas de greenwashing o wokewashing. Sin embargo, esta señal inicial no es estática. A medida que la operación se concreta y se divulga información adicional: tamaño, precio, estructura de incentivos, uso de los fondos, etc., el contenido de la señal se actualiza y, con él, las expectativas de los distintos públicos.

En este punto entra en juego la EMH, que describe cómo el mercado incorpora de forma rápida y eficiente la nueva información al precio de los instrumentos financieros. En los mercados, la reacción positiva del mercado bursátil asociada a la señal positiva, tras el anuncio de la emisión, tiende a disiparse cuando la transacción se hace efectiva (fecha de emisión) y se elimina la incertidumbre residual sobre sus características. De este modo, los precios del bono y, por extensión, los de la acción, reflejan no sólo las percepciones iniciales, sino también la información posterior sobre la calidad de la operación y la

capacidad de la empresa para cumplir los objetivos ESG comprometidos. Integrar secuencialmente Atención → Señal → Precio supera los enfoques parciales que se limitan a la motivación directiva, a la comunicación externa o a la eficiencia de precios, y permite conectar estrategia corporativa, reputación externa y valoración de mercado en un único marco analítico coherente.

5.3. Implicaciones para la práctica empresarial, los inversores y los reguladores públicos

La presente tesis doctoral evidencia que los bonos ESG pueden convertirse en catalizadores de una transformación estratégica de la empresa, aunque dicha transformación no es automática ni uniforme en todos los contextos organizativos. A continuación, se exponen las principales implicaciones que las empresas deberían considerar al incorporar estos instrumentos en sus políticas financieras y de sostenibilidad.

En primer lugar, aunque el mero hecho de emitir este tipo de bonos no garantiza mejoras en el desempeño medioambiental, sí puede favorecer la focalización de la atención directiva hacia objetivos de sostenibilidad, siempre y cuando exista una adecuada coordinación interna. Así, la emisión de bonos verdes, por ejemplo, tiene el potencial de redirigir esfuerzos y recursos en todos los niveles de la organización, lo cual resulta especialmente relevante para impulsar prácticas y procesos más responsables. Este enfoque se fundamenta en la ABV, según la cual la alta dirección, al comprometerse con metas explícitas ligadas a la sostenibilidad, logra que los equipos operativos pongan en marcha iniciativas orientadas a la mejora medioambiental.

En segundo lugar, resulta esencial considerar las condiciones internas de la empresa antes de embarcarse en una emisión de bonos ESG. Tal como se señala en el Capítulo 2, factores como la tasa de crecimiento, la rentabilidad y el nivel de endeudamiento pueden condicionar la capacidad de convertir los recursos captados en resultados tangibles. De ahí que no baste con destinar cierta cantidad de fondos a proyectos verdes o sociales, sino que sea preciso valorar la proporción que esos fondos representan respecto al total de activos o de la deuda. Cuando la emisión es significativa en relación con la estructura financiera de la empresa, se genera un mayor sentido de urgencia y compromiso en todas

las áreas, lo que incrementa la probabilidad de lograr mejoras considerables en el desempeño medioambiental. Por otra parte, una estructura financiera sólida y un crecimiento empresarial estable permiten absorber mejor las inversiones de mayor plazo inherentes a muchos proyectos de sostenibilidad.

En tercer lugar, el Capítulo 3 revela que los bonos ESG pueden utilizarse como una señal reputacional poderosa, al comunicar a accionistas y otros grupos de interés el compromiso corporativo con la sostenibilidad. Sin embargo, dicha señal solo es efectiva si se gestiona con coherencia y transparencia. Una empresa que anuncie objetivos ambiciosos, pero no cumpla con la divulgación de resultados ni con la correcta asignación de los fondos, se arriesga a caer en prácticas de greenwashing. Por este motivo, es imprescindible asegurar la correspondencia entre la imagen que se proyecta y las acciones reales de mejora interna. Además, aquellas empresas que ya han demostrado un historial positivo en materia de sostenibilidad son más propensas a reforzar su reputación mediante la emisión de bonos ESG, mientras que las rezagadas pueden encontrar mayores obstáculos de credibilidad y un escepticismo inicial de los mercados.

En cuarto lugar, el análisis del Capítulo 4 sobre la reacción del mercado bursátil el día efectivo de la emisión de bonos ESG aporta una perspectiva interesante. Si bien el anuncio de un bono ESG suele suscitar optimismo, la fecha de emisión puede generar movimientos de ajuste en la cotización, sobre todo si los inversores perciben riesgos asociados al coste financiero de la emisión o a la eventual falta de beneficios en el corto plazo. Esta discrepancia refuerza la idea de que la empresa debe mantener un discurso claro, alineado con una visión de largo plazo, en el que se detallen las ventajas competitivas y los impactos esperados de cada proyecto que se financiará. En este sentido, los SLBs, que permiten mayor flexibilidad en el destino de los recursos, podrían atenuar la volatilidad inicial, ya que reducen la percepción de rigidez financiera al no estar vinculados a un único conjunto de proyectos específicos.

En consecuencia, los resultados integrados de los Capítulos 2, 3 y 4 permiten diseñar una pauta operativa clara para la emisión de bonos ESG. La eficacia medioambiental y reputacional del instrumento depende de la confluencia de tres factores: la fase del ciclo de vida corporativo, la solidez económica y el posicionamiento sostenible de la empresa. Las empresas que atraviesan una fase de expansión sostenida en crecimiento, rentabilidad

económica y endeudamiento convierten antes los recursos captados en mejoras tangibles. Para ellas, resulta aconsejable colocar bonos de alta intensidad financiera, es decir, con un importe relativamente elevado respecto al total de activos y/o deudas, durante esa fase de crecimiento o solidez económica, a fin de maximizar el impacto positivo de la operación. Del mismo modo, las empresas con un historial sostenible consolidado obtienen un beneficio reputacional adicional; por el contrario, las empresas rezagadas deberían reforzar primero su transparencia o, alternativamente, recurrir a SLBs que permiten fijar objetivos graduales y amortiguar la volatilidad inicial. De este modo, la decisión óptima armoniza etapa de crecimiento, músculo financiero y credibilidad en sostenibilidad, incrementando la probabilidad de capturar beneficios medioambientales, reputacionales y de creación de valor a largo plazo.

En quinto lugar, la emisión de bonos ESG no puede concebirse como una actuación aislada, sino que debe integrarse en la estrategia global de la empresa. Esto exige coordinar la asignación de recursos con políticas de innovación, recursos humanos y buen gobierno que posibiliten proyectos verdaderamente transformadores, así como promover la cooperación constante entre la dirección financiera y la de sostenibilidad para alinear el financiamiento con los objetivos medioambientales y sociales de la organización. Al mismo tiempo, la transparencia y la rendición de cuentas se erigen en pilares imprescindibles: la credibilidad de estas emisiones se refuerza mediante auditorías externas, certificaciones verificables y la difusión periódica de resultados, especialmente cuando se adoptan estándares reconocidos internacionalmente, como los Green Bond Principles o los Sustainability-Linked Bond Principles de la ICMA. De este modo, los bonos ESG consolidan su doble condición de fuente de financiación y palanca de transformación sostenible, aportando claridad y confianza a accionistas y demás grupos de interés.

También, la presente tesis doctoral tiene implicaciones prácticas para los inversores. En primer lugar, la creciente relevancia de los bonos ESG constituye para los inversores una oportunidad de diversificación y de alineación de carteras con criterios de sostenibilidad. Tal y como muestran los hallazgos de la tesis en sus capítulos 2, 3 y 4, la emisión de bonos ESG no solo puede conllevar mejoras potenciales en el desempeño medioambiental y reputacional de la empresa emisora, sino que además abre la posibilidad de que los inversores capturen valor a largo plazo. Sin embargo, resulta esencial evaluar en

profundidad la solidez de los proyectos financiados y la coherencia estratégica de la empresa antes de tomar decisiones de inversión.

En segundo lugar, la información transparente y las auditorías externas adquieren un papel decisivo para minimizar el riesgo de greenwashing y garantizar que el capital se destine efectivamente a iniciativas sostenibles. La adopción de marcos reconocidos internacionalmente, como los Green Bond Principles, facilita la comparación entre emisiones y aporta seguridad a los inversores, que pueden así discriminar aquellas oportunidades con mayores garantías de cumplimiento.

En tercer lugar, conviene recordar que la volatilidad bursátil en torno a las fechas de emisión de bonos ESG puede reflejar percepciones diferenciadas acerca de los compromisos sostenibles de la empresa y de la rentabilidad asociada. Por ello, los inversores han de mantener una visión de medio y largo plazo, sopesando tanto los posibles beneficios reputacionales como los riesgos adicionales que suponen las obligaciones financieras ligadas al cumplimiento de objetivos ESG. De este modo, podrán incorporar con mayor criterio los bonos ESG en sus estrategias de inversión diversificada.

Por último, la presente tesis doctoral también tiene implicaciones para los reguladores públicos. En primer lugar, los resultados de esta investigación sugieren que la labor de los reguladores en el ámbito de los bonos ESG puede reforzarse a través de la imposición de estándares de transparencia y la promoción de auditorías rigurosas. La constatación de que la efectividad de estos instrumentos depende en gran medida de la credibilidad en la asignación de fondos y de la verificación de resultados justifica la necesidad de marcos uniformes y comparables. Una regulación que defina con nitidez las obligaciones de reporte, la periodicidad de divulgación y las características técnicas de los proyectos financiados ayudará a disminuir la asimetría informativa que a menudo caracteriza los mercados financieros.

En segundo lugar, es aconsejable que los reguladores introduzcan incentivos y posibles sanciones para reforzar la función transformadora de estos bonos en la práctica empresarial. Los capítulos 2, 3 y 4 de la tesis han mostrado casos en los que la emisión de bonos ESG no siempre conlleva mejoras significativas, por lo que políticas públicas que premien la consecución de objetivos medibles, mediante subsidios o ventajas fiscales,

y penalicen incumplimientos graves, por ejemplo, con la imposición de multas, podrían fomentar la adopción de acciones más contundentes y auténticas.

En tercer lugar, conviene recordar que la coordinación de esfuerzos entre diversas instituciones, tanto nacionales como internacionales, es clave para alinear el desarrollo de estos instrumentos con la agenda global de sostenibilidad. Al favorecer la comunicación y la acción conjunta de organismos reguladores, entidades financieras y el sector privado, se fortalecerá la confianza en los mercados de bonos ESG y se asegurará su contribución real a la transición hacia una economía con menor impacto medioambiental y mayor justicia social. De esta forma, el papel del regulador se torna esencial para potenciar la penetración y la credibilidad de los bonos ESG en el mercado, garantizando la coherencia y la efectividad de los compromisos adquiridos por las empresas emisoras.

5.4. Limitaciones y futuras líneas de investigación

Los resultados y conclusiones obtenidas en la presente tesis doctoral no están exentos de limitaciones, las cuales constituyen puntos de partida para propuestas de investigación futuras. A pesar de que los análisis de los capítulos 2, 3 y 4 arrojan evidencia sólida acerca del papel de los bonos ESG en la atención directiva, la reputación corporativa y la reacción del mercado bursátil, es importante subrayar las siguientes consideraciones.

En primer lugar, se debe señalar la delimitación de la muestra y el periodo de estudio, lo cual afecta la generalización de los hallazgos. Los datos analizados en el Capítulo 2 se centraron en un conjunto de empresas emisoras de bonos verdes, usando un período de observación que permitió evaluar su desempeño medioambiental antes y después de la emisión. Aunque se obtuvo un número significativo de observaciones, el mercado de bonos ESG presenta una evolución rápida y no uniforme en todas las regiones geográficas. Por ello, investigaciones adicionales podrían ampliar el rango temporal y geográfico para capturar la creciente diversidad de emisores, especialmente en mercados emergentes, donde las condiciones económicas y regulatorias son sustancialmente distintas de las de países desarrollados. Además, profundizar en submuestras sectoriales, como empresas de sectores altamente contaminantes frente a sectores de servicios, ayudaría a entender mejor cómo varía el efecto de los bonos ESG según la naturaleza del negocio.

En segundo lugar, conviene mencionar las limitaciones metodológicas en la medición de variables y en el diseño de los modelos econométricos. El Capítulo 3, al analizar el valor reputacional que puede aportar la emisión de bonos ESG, se basó en índices de reputación y de riesgo reputacional que, si bien son referencias reconocidas en la literatura, pueden no reflejar de forma completa la percepción de todos los grupos de interés. Del mismo modo, la medición de la reputación corporativa sigue siendo un desafío, puesto que se trata de un constructo intangible y dinámico, influido por factores culturales y mediáticos no siempre captados por las bases de datos utilizadas. Sería recomendable, por tanto, explorar aproximaciones más cualitativas que incluyan entrevistas con directivos, inversores y otros públicos estratégicos. De igual manera, futuras investigaciones podrían combinar técnicas cuantitativas con estudios de caso detallados que permitan valorar cómo se gestiona la señal reputacional cuando surgen controversias o acusaciones de greenwashing.

Además, conviene reconocer que los ESG Scores de Refinitiv empleados a lo largo de la tesis presentan ciertas limitaciones metodológicas. Por un lado, una mayor intensidad de reporting tiende a inflar las calificaciones al premiar la cantidad de información divulgada (Christensen et al., 2022); por otro, se ha observado que las empresas más grandes obtienen sistemáticamente puntuaciones más altas debido a su mayor capacidad de divulgación, no necesariamente a un mejor desempeño en sostenibilidad (Drempetic et al., 2020). Estos sesgos pueden haber sobreestimado parte de los efectos identificados. Futuras investigaciones deberían contrastar los hallazgos con métricas alternativas, por ejemplo, indicadores basados en resultados medioambientales verificados o análisis cualitativos, y emplear modelos que controlen explícitamente la intensidad de la divulgación y el tamaño corporativo.

En tercer lugar, el análisis de la reacción del mercado bursátil a la emisión de bonos ESG (abordado en el Capítulo 4) se centró fundamentalmente en la fecha efectiva de la emisión, mostrando que la respuesta de los inversores puede diferir de la recibida en el anuncio inicial. Aunque la metodología de estudio de eventos brinda solidez estadística en la estimación de los rendimientos anormales, cabe destacar que esta aproximación asume mercados semifuertes y la capacidad de los inversores de procesar toda la información disponible en un plazo relativamente breve. No obstante, es posible que los inversores muestren reacciones excesivas o insuficientes debido a factores conductuales,

lo cual sugiere la necesidad de realizar una observación detallada de la volatilidad en periodos posteriores a la emisión. Asimismo, sería valioso comparar cómo reaccionan inversores minoristas y grandes fondos institucionales, pues es posible que sus niveles de información y criterios de decisión difieran de manera importante.

En relación con lo anterior, una futura línea de investigación interesante consistiría en profundizar en cómo la estandarización y la certificación externa impactan en la credibilidad de los bonos ESG. Aunque la literatura ha estudiado algo sobre el tema (Fatica & Panzica, 2021; Flammer, 2021), se desconoce hasta qué punto el tipo de certificación o el organismo certificador influyen específicamente en la acogida que reciben estos instrumentos. Estudiar la diferencia entre bonos ESG con y sin certificaciones reconocidas, o la credibilidad de certificadoras de distinto prestigio, podría arrojar luz sobre las condiciones que legitiman la emisión ante inversores y sociedad civil.

Otro ámbito para profundizar se relaciona con la perspectiva de los mercados emergentes, donde los bonos ESG están empezando a tener más protagonismo, pero en entornos regulatorios diversos. En estos contextos, factores políticos, sociales y macroeconómicos tienen un peso significativo en la efectividad de los instrumentos financieros sostenibles. Explorar dichas particularidades permitiría comprender si las conclusiones de la tesis se sostienen en economías con estructuras de mercado y gobernanza menos consolidadas.

Otro posible ámbito de interés radica en el estudio de nuevos tipos de bonos ESG, como los bonos de transición, que están surgiendo para financiar proyectos en sectores que, pese a tener un alto impacto en emisiones, buscan realizar un cambio paulatino hacia modelos más sostenibles. Estos instrumentos responden a la necesidad de abordar una transformación industrial realista en industrias como la petroquímica, la siderúrgica o la del cemento, donde la descarbonización completa requiere grandes inversiones y avances tecnológicos sustanciales. Investigar hasta qué punto los bonos de transición efectivamente promueven mejoras significativas o si, por el contrario, podrían ser empleados como un mecanismo temporal de señalización, plantea interrogantes sobre su legitimidad, su regulación y su efectividad medioambiental. A su vez, comparar el impacto reputacional y de desempeño corporativo de los bonos de transición frente a los bonos ESG convencionales sería de gran utilidad para comprender mejor la evolución del

mercado y la capacidad de las empresas emisoras para enfrentar los desafíos de la transición energética y la urgencia climática.

Por último, es de interés examinar el rol de la digitalización y la innovación tecnológica, por ejemplo, blockchain, en la emisión y seguimiento de bonos ESG. La trazabilidad mejorada que proporcionan las plataformas digitales podría resultar en una mejor supervisión de los proyectos financiados, lo que redundaría en una mayor confianza por parte de los inversores e, incluso, en la reducción de costes de emisión. Evaluar cómo el uso de soluciones tecnológicas incide en la eficiencia y transparencia del mercado de bonos ESG constituiría, sin duda, otra línea de investigación con gran potencial.

Por tanto, aunque la presente investigación aporta evidencias relevantes acerca del papel de los bonos ESG en la sostenibilidad corporativa, la reputación empresarial y la percepción del mercado, existen múltiples interrogantes aún abiertos. Abordar estos vacíos mediante diseños de investigación más amplios, con metodologías mixtas y la inclusión de nuevos contextos y enfoques, permitirá seguir enriqueciendo el conocimiento académico y la práctica empresarial en torno a las finanzas sostenibles.

Referencias

Arévalo, G., González, M., Guzmán, A., & Trujillo, M. A. (2024). The value effect of sustainability: evidence from Latin American ESG bond market. Journal of Sustainable Finance & Investment, 1-22.

Bergh, D. D., Connelly, B. L., Ketchen Jr, D. J., & Shannon, L. M. (2014). Signaling theory and equilibrium in strategic management research: An assessment and a research agenda. *Journal of Management Studies*, *51*(8), 1334-1360.

Benlemlih, M., Jaballah, J., & Kermiche, L. (2023). Does financing strategy accelerate corporate energy transition? Evidence from green bonds. *Business Strategy and the Environment*, *32*(1), 878-889.

Christensen, D. M., Serafeim, G., & Sikochi, A. (2022). Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review*, *97*(1), 147-175.

Connelly, B. L., Certo, S. T., Ireland, R. D., & Reutzel, C. R. (2011). Signaling theory: A review and assessment. *Journal of Management*, *37*(1), 39-67.

DesJardine, M. R., Marti, E., & Durand, R. (2021). Why activist hedge funds target socially responsible firms: The reaction costs of signaling corporate social responsibility. *Academy of Management Journal*, *64*(3), 851-872

Drempetic, S., Klein, C., & Zwergel, B. (2020). The influence of firm size on the ESG score: Corporate sustainability ratings under review. *Journal of business ethics*, *167*(2), 333-360.

Fama, E. F. (1970). Efficient capital markets. *Journal of Finance*, *25*(2), 383-417.

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment*, *30*(5), 2688-2701.

Flammer, C. (2021). Corporate green bonds. Journal of Financial Economics, 142(2), 499-516.

Larcker, D. F., & Watts, E. M. (2020). Where's the greenium?. *Journal of Accounting and Economics*, *69*(2-3), 101312.

Lian, J., Huang, X., & Wu, X. (2024). How green bonds promote firms' green collaborative innovation?. *Corporate Social Responsibility and Environmental Management*, *31*(3), 2109-2126.

Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives*, *17*(1), 59-82.

Mathew, S., & Sivaprasad, S. (2024). An empirical analysis of corporate sustainability bonds. *Business Strategy and the Environment*, *33*(4), 3299-3316.

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*, *18*(S1), 187-206.

Ocasio, W. (2011). Attention to attention. *Organization science*, *22*(5), 1286-1296.

Park, H. D., & Patel, P. C. (2015). How does ambiguity influence IPO underpricing? The role of the signaling environment. *Journal of Management Studies*, *52*(6), 796-818.

Spence, M. (1973). Job market signaling. *Quarterly Journal of Economics,* 87, 355-374.

Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds?. *Journal of Corporate Finance*, *61*, 101427.