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**Tesis doctoral**

**Impact of corporate sustainable behaviour on  
the cost of equity**

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## **DEDICATORIA**

*A mi esposa Teresa e hija Valentina quienes han sido una fuente de inspiración y aliento en momentos de apremio y cansancio. A mis padres y hermana quienes han estado presentes a lo largo de este proceso y siempre me han dado su apoyo incondicional.*



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## SIGLAS Y ACRÓNIMOS

2SLS	Two-stage Least Squares
BOD	Board of Directors (Consejo de Administración)
BRIC	Brasil, Rusia, India y China
BTM	Book to Market ratio (Valor en Libros sobre Valor de Mercado)
CDP	Carbon Disclosure Project
CO2	Dióxido de Carbono
CoE	Cost of Equity (Costo de Capital)
CSR	Corporate Social Responsibility (Responsabilidad Social Empresarial- o corporativa)
EFRAG	European Financial Reporting Advisory Group
EIP	Entidad de Interés Público.
EPS	Earnings per Share (Ganancias por Acción)
ESG	Environmental Social Governance (Ambiental, Social y de Gobierno Corporativo)
EU	European Unión (Unión Europea)
F&B	Food & Beverage (Alimentos y Bebidas)
FE	Fixed Effect (Modelo de Efectos Fijos)
GHG	Green House Gas (Gases de Efecto Invernadero)
GLS	Generalized Least Squares
GMM	Generalized Method of Moments (Método Generalizado de Momentos)
GRI	Global Reporting Initiative
I-B-E-S	International Broker Estimates
LVG	Leverage (Apalancamiento)
MILA	Mercado Integrado Latinoamericano
MKTCAP	Market Capitalization (Capitalización de Mercado)
OLS	Ordinary Least Squares (Mínimos Cuadrados Ordinarios)
ODS	Objetivos de Desarrollo Sostenible
PEG	Price Earnings Growth model (Modelo de Crecimiento de Precio Beneficios)
PRI	Principles for Responsible Investment (Principios de Inversión Responsable)
ROA	Return on Assets (Retorno sobre Activos, rentabilidad económica)
ROE	Return on Equity (Retorno sobre Patrimonio, rentabilidad financiera)
SASB	Sustainability Accounting Standards Board
SDG	Sustainable Development Goals (Objetivos de Desarrollo Sostenible, ODS)
SIZE	Market Size (Capitalización Bursátil de Mercado)
TA	Total Assets (Activos Totales)
UN	United Nations (Naciones Unidas)



## **RESUMEN Y PLANTEAMIENTO GENERAL DE LA INVESTIGACIÓN**





### 1.1 Motivación y justificación de la investigación

El nuevo paradigma social y empresarial impulsa a las firmas cotizadas a adoptar prácticas sostenibles para tratar de evitar la degradación del planeta Tierra, la reducción de la capa de ozono, el derretimiento de los polos, y a mejorar las condiciones de vida de muchas personas del mundo, además de contribuir a dar una mejor imagen ante diferentes grupos de interés conocidos como “*stakeholders*”.

La concienciación sobre todos estos problemas globales ha llevado a los agentes económicos a adoptar objetivos a medio y largo plazo. En ese sentido, la divulgación de reportes de sostenibilidad por firmas multinacionales se ha incrementado de un 36% a un 96% durante 1999 al 2020 (KPMG, 2020). En Latinoamérica, las empresas están intentando pasar de ser empresas extractoras y exportadoras de recursos a implementar tecnología para el desarrollo de productos y servicios con valor agregado, lo que les ayuda a obtener financiación de los mercados. Así, la región ha recibido flujos de inversión extranjera directa por 151 miles de millones de dólares (United Nations Conference on Trade and Development, 2018) e incrementado la divulgación de memorias de sostenibilidad de 83% al 90% desde 2017 al 2020 (KPMG, 2020).

Además, los 17 Objetivos de Desarrollo Sostenible (ODS o SDG por sus siglas en inglés) de la Agenda 2030 planteados por las Naciones Unidas buscan cumplir una serie de mejoras en cuestiones clave para asegurar un futuro sostenible para la humanidad, entre los que cabe destacar, por las variables utilizadas en nuestros trabajos, los objetivos vinculados a Igualdad de Género (ODS 5), uso de fuentes de energía renovable y mitigación de Cambio Climático (ODS 13) y Consumo Responsable y Producción (ODS 12).

Es importante mencionar que se persigue promover la sostenibilidad a nivel global, en todos los sectores pero nuestra tesis presta atención especial en uno de los artículos al sector de alimentos y bebidas, que es responsable del 30% de las emisiones globales de CO<sub>2</sub> (Clark *et al.*, 2020). Entre los ODS de la Agenda 2030, el decimosegundo objetivo “Producción y Consumo Responsable” busca eliminar 1.3 miles de millones de toneladas de desperdicios de alimentos. El decimotercer objetivo “Acción por el Clima” se orienta a reducir las emisiones de CO<sub>2</sub> (United Nations Statistic Division, 2020). Finalmente, el decimocuarto objetivo “Vida Submarina” concierne a la contaminación de fuentes hídricas

(ríos, lagos y mares) por plásticos generados fundamentalmente por el sector de alimentos y bebidas (Weber & Hogberg-Saunders, 2018), creando externalidades negativas al medio ambiente. El *Carbon Disclosure Project* (CDP) analiza de hecho un grupo de empresas del sector de alimentos, principalmente la cadena de producción y valor agregado de alimentos (CDP, 2020). Justamente, el último de los trabajos que forman parte del compendio de artículos de esta tesis se centra en dicho sector.

El antiguo axioma empresarial de maximizar las ganancias para los accionistas ha cambiado considerablemente dados los riesgos de no-sostenibilidad y el cambio climático. Así, el G7 (EEUU, Canadá, Reino Unido, Francia, Japón, Italia y Alemania) y los países denominados BRICS – (Brasil, Rusia, India y China) son responsables del 70% del total de las emisiones de CO<sub>2</sub> a nivel global (Lemma *et al.*, 2019) y las empresas se enfrentan a juicios y pérdida de imagen y reputación si llevan a cabo comportamientos no responsables a nivel social o medioambiental. Como referencia, los desastres naturales generados por el cambio climático han generado pérdidas de 3 mil millones de dólares y 1.3 millones de vidas desde 1998 hasta el 2017 (United Nations Statistic Division, 2020). Es por ello que las firmas buscan no solo ser rentables e incrementar sus beneficios, sino también tener un comportamiento más responsable teniendo en cuenta los grupos de interesados o *stakeholders* que les demandan un comportamiento más sostenible bajo presiones sociales y políticas. En este sentido, el Acuerdo de París de 2015 busca reducir la temperatura global a dos grados centígrados sobre los niveles pre-industriales. *Stakeholders* públicos y privados realizan presiones sobre las organizaciones para cumplir dichos objetivos cambiando a fuentes de energías renovables y reduciendo el consumo de recursos finitos. Para ese cometido, algunas naciones se han comprometido a reducir sus emisiones de CO<sub>2</sub>. De este modo, para el año 2030, la Unión Europea ha fijado un objetivo del 40% mientras China ha planteado una reducción del 65% (Zhang & Liu, 2020). Para el cumplimiento de ese decimotercer ODS, los mercados bursátiles *over the counter* pueden contribuir especialmente al facilitar mecanismos de financiación de proyectos sostenibles. Así, fondos de inversión con 900 millones de dólares en activos consideran invertir en propuestas de países emergentes y en China se han invertido ya 7 mil millones de dólares en proyectos sostenibles (United Nations Conference on Trade and Development, 2020).

De hecho, existen diferentes iniciativas del ámbito bursátil que distinguen a las empresas sostenibles. Por ejemplo, el *Dow Jones Sustainable Index* (DJSI) considera

empresas del mundo teniendo en cuenta su desempeño conforme a cuestiones de tipo ESG (es decir, de naturaleza Ambiental, Social y Gobernanza Corporativa, ESG por sus siglas en inglés), o las series del FTSE4Good, índices bursátiles compuestos por firmas en el Reino Unido o en otros países (como, por ejemplo, en España el FTSE4Good IBEX Index), que cumplen requisitos ambientales y son socialmente responsables, considerando aspectos como el cambio climático, consumo adecuado de recursos hídricos, derechos humanos, transparencia tributaria y combate contra la corrupción (FTSE Russell, 2021). Por otra parte, 90 fondos de inversión privados adheridos a las prácticas PRI (*Principles for Responsible Investment*, es decir, Principios de Inversión Responsable) poseen activos por 700 miles de millones de dólares destinados al *Initiative Climat International* que busca mitigar el cambio climático (Principles for Responsible Investment, 2021).

Nuestra investigación estudia cómo una importante variable sobre el perfil de riesgo de las empresas, esto es, el Costo de Capital (CoE) se ve afectada por el comportamiento responsable de las mismas. El CoE consiste en la rentabilidad porcentual que percibe el inversionista por sacrificar retornos a corto plazo para obtener ganancias a largo plazo (Garzon & Zorio-Grima, 2021a), o la tasa de retorno requerida para descontar a valor actual los dividendos futuros (El Ghoul *et al.*, 2011). Representa un fuerte indicador sobre la capacidad de financiación para las firmas cotizadas, además de para la gestión de carteras de inversión, financiación de proyectos de inversión o valoración de firmas, entre otros. Cada vez lo tienen más en cuenta los gestores, los académicos en sus investigaciones e incluso organismos reguladores como el *Sustainability Accounting Standards Board* (SASB), quien dice emitir sus estándares de sostenibilidad para identificar los riesgos y oportunidades que afectan la posición financiera de la organización (esto es, a su balance de situación), su obtención de beneficios (es decir, a la cuenta de resultados) o su perfil de riesgo (a través del Costo de Capital) (GRI & SASB, 2021).

La responsabilidad social empresarial (CSR, por sus siglas en inglés) se define como el “triple eje” y consiste en la divulgación económica, medioambiental, social y de gobierno corporativo según Elkington (1998), tras la adopción de actividades medioambientales y sociales por parte de la firma con el fin de integrar de forma voluntaria a diferentes *stakeholders* en sus operaciones (European Commission, 2011).

De lo anteriormente expuesto, la motivación de esta tesis doctoral consiste en medir cómo el comportamiento sostenible de empresas que cotizan en mercados bursátiles afecta el Costo de Capital de dichas firmas tomando en cuenta distintos indicadores para medir su información sobre impacto ambiental, económico y social.

Hemos de resaltar la oportunidad de nuestra investigación pues los organismos de todo el mundo y la prensa se hacen eco de que determinadas empresas pueden estar aprovechándose de estas cuestiones que examinamos en la tesis bajo un planteamiento poco ético. Por ejemplo, las “*Greenwash Firms*” son firmas que divulgan información sobre sus iniciativas de ESG pero no invierten de modo suficiente en actividades sostenibles. Weber (2018) expande dicho concepto indicando que dichas firmas tienen alto Costo de Capital dado que divulgan sus memorias de sostenibilidad empleando altos estándares del *Global Reporting Initiative* (GRI), pero no aseguran sus informes por externos. En este sentido, en esta tesis empleamos no solo indicadores de reporte sino también de desempeño ESG y de aseguramiento externo.

En la actualidad, la Directiva 2014/95/EU obliga a las Entidades de Interés Público (EIP) en la Unión Europea con más de 500 empleados a divulgar información de tipo no-financiero. En diciembre de 2019 se anunció el *European Green Deal* por el que la Unión Europea (EU, por sus siglas en inglés) espera ser la primera región neutral en términos climáticos en 2050 con un ambicioso plan de acción. En este sentido se está revisando la Directiva 2014/95/EU, pues desde el inicio de su aplicación en 2018 se aprecia falta de comparabilidad, credibilidad y relevancia de la información sobre sostenibilidad que emiten las empresas cotizadas. La propuesta de nueva Directiva busca reducir en su totalidad las emisiones de CO<sub>2</sub> para el 2050, alentar que todos los ciudadanos participen hacia una economía sustentable, conservar el capital natural de la EU y deslindar el crecimiento económico de la demanda de recursos naturales (European Commission, 2021). Además, la Comisión Europea impulsará un proceso progresivo no obligatorio considerando unos mínimos requisitos en materia de aseguramiento de informes de sostenibilidad. Así, hemos de destacar la contribución del *European Financial Reporting Advisory Group* (EFRAG) mediante equipos técnicos en este proceso para desarrollar estándares específicos en materia de elaboración de reportes de sostenibilidad para la EU, y además, iniciará un proceso de armonización y convergencia con estándares de sostenibilidad aceptados, siendo el *Global Reporting Initiative* (GRI) un co-constructor de estas normas europeas junto con

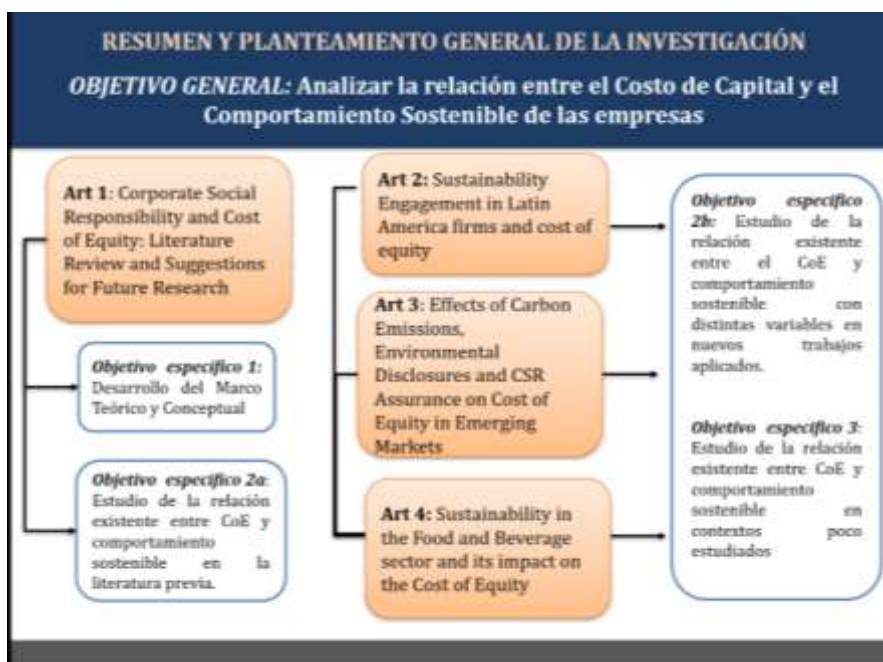
el propio EFRAG (EFRAG, 2021). Finalmente, cabe subrayar el concepto de “doble materialidad” que considera riesgos e impacto ambiental y social generados por la firma (IOSCO, 2021).

### 1.2 Estructura de la tesis doctoral

Esta tesis doctoral sigue la modalidad de compendio de artículos. Se compone de este apartado inicial que ofrece el planteamiento general de la investigación incluyendo las conclusiones, limitaciones y líneas futuras, seguido de una serie de anexos que son formalmente el compendio de artículos en sí. Específicamente, se trata de cuatro artículos que incluyen una revisión bibliográfica y tres estudios empíricos que abordan los objetivos planteados en esta investigación doctoral, y cuyos resultados han sido transferidos a la comunidad académica a través de publicaciones científicas en prestigiosas revistas.

La figura 1 presenta un esquema con la estructura de la tesis, vinculándola a los objetivos de la misma, que se desarrollan en un epígrafe posterior.

**Figura 1** Estructura y objetivos de la tesis doctoral



Este resumen y planteamiento general de la investigación se presenta en español y ofrece la motivación y justificación de esta investigación doctoral, la estructura de la propia tesis, una aproximación al marco teórico y a la literatura previa relacionada, el desarrollo de los objetivos de la tesis, un subapartado sobre la metodología aplicada y un resumen de cada uno de los artículos, acabando con las conclusiones que se obtienen de la tesis, sus limitaciones y distintas sugerencias para la investigación futura.

Los anexos recogen los cuatro artículos de la tesis, que han sido publicados en lengua inglesa, dada la vocación internacional de la investigación realizada y de las revistas objetivo.

El **anexo 1** desarrolla el primer estudio y tiene como objetivo general “analizar la relación entre el Costo de Capital (CoE, por sus siglas en inglés) y el comportamiento sostenible de las empresas cotizadas” en la literatura previa. Ello supone la consecución de los objetivos específicos 1 y 2a, es decir el desarrollo del marco teórico y conceptual de la tesis y el análisis de la relación entre el CoE y el comportamiento sostenible a través de distintas variables en la literatura. Los resultados se han transferido a la comunidad académica a través de la publicación en 2020 del artículo: “*Corporate Social Responsibility and Cost of Equity: Literature review and Suggestions for Future Research*” en la revista *Journal of Business, Accounting and Financial Perspectives*. Dicha revista no está indexada pero se encuentra vinculada a JAMS de la plataforma MDPI.

Ha recibido varias citaciones entre las que podemos destacar:

Córdova, C., Zorio-Grima, A & Merello, P. (2021). Contextual and corporate governance effects on carbon accounting and carbon performance in emerging economies. *Corporate Governance*, 21(3), 536-550.

Loprevite, S., Raucci, D., & Rupo, D. (2020). KPIs reporting and financial performance in the transition to mandatory disclosure: the case of Italy. *Sustainability*, 12(12), 5195.

Moro-Visconti, R. (2021). Boosting Sustainable Growth with Innovative Intangibles. In *Startup Valuation* (pp. 81-112). Palgrave Macmillan, Cham.

El **anexo 2** desarrolla el segundo estudio, el cual guarda relación con los objetivos específicos 2b y 3, esto es, el “estudio de la relación existente entre el CoE y comportamiento sostenible con distintas variables en nuevos trabajos aplicados” y el “estudio de la relación existente entre el CoE y comportamiento sostenible en contextos pocos estudiados”. Los resultados fueron publicados en 2021 a través del artículo “*Sustainability engagement in Latin America firms and cost of equity*” en la revista *Academia Revista Latinoamericana de Administración*. Esta revista está indexada en *Journal of Citations Reports* en el cuartil Q4 en *Business 2020*, con un índice de 1.108, y en el *Scimago Journal and Country Rank* en el cuartil Q3 2019 de *Economics, Econometrics and Finance (miscellaneous)* con un índice de H13.

Ha sido citado, entre otros trabajos, por:

Bui, B., Houqe, M.N & Zaman, M. (2021). Climate change mitigation: Carbon assurance and reporting integrity. *Business Strategy and the Environment*, 30(8), 3839-3853.

Cardona-Montoya, J.C. (2022). Mercado Integrado Latinoamericano: diez años después de su integración. Un análisis bibliométrico para el periodo 2008-2021. *Revista CEA*, 8(16), e 1863.

Janah, O. O., & Sassi, H. (2021). The ESG impact on corporate financial performance in developing countries: A systematic literature review. *International Journal of Accounting, Finance, Auditing, Management and Economics*, 2(6), 391-410.

El **anexo 3** desarrolló el tercer estudio y el entregable guarda pertinencia, de nuevo, con los objetivos específicos 2b y 3. Los resultados fueron publicados en 2021 en el artículo “*Effects of Carbon Emissions, Environmental Disclosures and CSR Assurance on Cost of Equity in Emerging Markets*” en la revista *Sustainability*. Dicha revista está indexada en 2020 en el *Journal of Citations Reports* en el Q2 en *Environmental Studies*, con un índice de 3.251, y el *Scimago Journal and Country Rank* en el cuartil Q2 2020 de *Renewable Energy, Sustainability and the Environment* con un índice de H85.

A continuación, se detallan las siguientes citas que ha recibido nuestro trabajo:

Bui, B., Houque, M.N & Zaman, M. (2021). Climate change mitigation: Carbon assurance and reporting integrity. *Business Strategy and the Environment*. 30(8), 3839-3853

Ding, X., & Shahzad, M. Effect of Environmental Penalties on the Cost of Equity– The Role of Corporate Environmental Disclosures. *Polish Journal of Environmental Studies*.2, 1-10.

Guastella, G., Mazzarano, M., Pareglio, S & Spani, R.C. (2022). Do environmental and emission disclosure affect firms' performance. *Eurassian Business Review*. 1-24

Lee, J.H & Cho, J.H. (2021). Firm-value effects of Carbon Emissions and Carbon Disclosures – Evidence from Korea. *International Journal of Environmental Research and Public Health*. 18(22). 12166.

Mia, P., Rana, T & Ferdous, L. (2021). Government Reform, Regulatory Change and Carbon Disclosure: Evidence from Australia. *Sustainability*. 13(21), 1-17.

Mia, M.D., Hasan, R & Usman, M. (2021). Carbon Emissions and Firm Performance: Evidence from Financial and Non-financial Firms from Selected Emerging Economies. *Sustainability*. 13(23), 13281.

Kozak, S. (2021). Will the Reduction of CO2 Emissions Lower the Cost of Debt Financing? The Case of the EU Countries. *Energies*. 14(24), 8361.

Okudo, A. G. (2021). Corporate governance and carbon disclosure practices of quoted manufacturing firms in Nigeria. *International Journal of Contemporary Research and Review*, 12(07), 20409-20419.

Zouari-Hadiji, R & Chouaibi, Y. (2021). Corporate ethical behavior and the cost of equity capital: evidence from the world's most ethical companies. *Journal of Financial Reporting and Accounting*. 19(5), 939-964.



Finalmente, el **anexo 4** recoge el cuarto y último artículo del compendio y guarda relación con los objetivos específicos 2b y 3. El trabajo fue publicado en el año 2021 con el título “*Sustainability in the food and beverage sector and its impact on the cost of equity*” en la revista *British Food Journal*. Esta publicación está indexada en el *Journal Citations Reports* en el cuartil Q3 en *Agricultural Economics & Policy* 2020, con un índice de 2.518 y en el *Scimago Journal and Country Rank* en cuartil Q2 de *Business Management and Accounting* con un índice de H80.

### 1.3 Marco teórico de la tesis y literatura previa relacionada

A continuación, se detallan diferentes aportaciones teóricas que sustentan la propuesta doctoral e inciden en la divulgación de la sostenibilidad y su relación con el Costo de Capital (CoE). Dicha relación ha sido explorada tomando en consideración diferentes variables, contextos, metodologías, regiones y sectores empresariales estudiados por la literatura previa.

#### Teoría de la Agencia

La teoría de la Agencia se sustenta en el “*stewardship problem*” o el conflicto existente entre los accionistas y la gerencia de la firma, dado que esta es propietaria de información privilegiada y por consiguiente los accionistas deben de incurrir en costos de monitoreo para evitar una posible extracción de activos de la empresa contra su interés (Jensen & Meckling, 1976). En ese sentido, la divulgación de información financiera y no financiera genera transparencia, reduce asimetrías de información y permite reducir dicho conflicto (Healy & Palepu, 2001).

Diferentes trabajos usan el marco de la Teoría de la Agencia para desarrollar su investigación sobre comportamiento sostenible y/o su relación con el CoE. Por ejemplo, la transparencia y divulgación de información permite que se minoren los costos de transacción, se incremente la demanda y liquidez de acciones ordinarias (Verrecchia, 2001), y también en el caso de la información no financiera, favorece que se mejore la toma de decisiones por parte de los *stakeholders* (Du *et al.*, 2010), y un incremento de los retornos

(Malik, 2015). Además, la divulgación voluntaria de reportes de sostenibilidad asegurados por consultoras externas (Sierra-García *et al.*, 2014) reduce asimetrías de información y, por consiguiente, el CoE (Martínez-Ferrero & García-Sánchez, 2017). En países donde existen altos niveles de protección hacia el inversor, una mayor divulgación de CSR reduce el CoE y por consiguiente protege al accionista de una posible expropiación de activos (Breuer *et al.*, 2018). En la misma línea, la divulgación voluntaria de prácticas ambientales y sociales reduce el CoE de empresas cotizadas en Reino Unido, lo cual conlleva a un incremento del valor de mercado (Ahmed *et al.*, 2019). Contrariamente, en países donde existe un alto nivel de protección hacia los *stakeholders*, la divulgación de CSR mediante reportes de sostenibilidad disminuye considerablemente el CoE en relación a firmas en países bajo ley común (Dhaliwal *et al.*, 2014). Además, en países donde existe escasa información financiera y pobres niveles de gobernanza, la divulgación de información económica, ambiental y social reduce el CoE y permite que fondos de inversión socialmente responsables inviertan en dichas firmas de acuerdo a Gupta (2018). En otros contextos, Feng *et al.*, (2015) concluyen que la relación entre la divulgación de índices ESG y el CoE es negativa en empresas de Norte América y Europa, pero dicha relación es positiva en firmas asiáticas dado que la inversión en CSR es considerada un gasto de publicidad. En el mismo contexto y tomando una muestra de empresas cotizadas del sector de manufacturas de India, Dahiya & Singh (2019) concluyen que existe una correlación entre la divulgación de CSR y el CoE considerando la política no voluntaria de invertir parte de los beneficios de la firma en actividades sustentables. Finalmente, Suto & Takehara (2017) concluyen que existe una relación no significativa entre la divulgación sobre responsabilidad social corporativa y el Costo de Capital de una muestra de empresas japonesas, aunque la variable aportación de accionistas institucionales reduce el CoE.

### Teoría de los *Stakeholders*

La Teoría de las partes interesadas (o *stakeholders*) se sustenta en proteger los intereses de los mismos (inversores, acreedores, clientes, proveedores, sociedad, gobierno, público en general, entre otras partes) maximizando el valor de mercado de la firma (Jensen, 2002). Además, bajo esta teoría uno de los propósitos de la firma sería divulgar información sobre las actividades de sostenibilidad hacia los *stakeholders* necesarias para mantener operaciones, reducir riesgos intrínsecos y el CoE (Li & Foo, 2015). Así, la

divulgación de información sobre ESG permite satisfacer la demanda de los *stakeholders* internos y externos de la firma y por consiguiente, mejora sus rendimientos financieros (Atan *et al.*, 2018).

Dentro de este marco teórico, diferentes estudios sobre CSR y CoE se iniciaron en países anglosajones dada la disponibilidad de información financiera y no financiera (Garzón-Jiménez & Zorio-Grima, 2020). En ese contexto, en Norte América, Sharfman & Fernando (2008) concluyen que existe una relación inversa entre la divulgación voluntaria de índices ambientales y el CoE - medido en su investigación a través del *Capital Asset Pricing Model*. El Ghoul *et al.*, (2011) concluyen que la divulgación voluntaria de actividades de CSR por parte de empresas cotizadas en Estados Unidos, disminuye el CoE e incrementa la base de los inversionistas. Harjoto & Jo (2015) indican que la divulgación sobre sostenibilidad obligatoria mediante normativas legales reduce la volatilidad del precio de la acción, elimina la falta de consenso de los accionistas y finalmente el CoE, en comparación con divulgaciones de tipo voluntario. En Europa, la calidad en la divulgación de información sobre CSR disminuye el CoE de empresas que cotizan en el IBEX-35 (Reverte, 2012). Además, la divulgación de RSC mediante informes de sostenibilidad reduce su CoE principalmente de empresas contaminantes o sensibles en Alemania (Michaels & Grüning, 2017). En Asia, Li & Foo (2015) estudian la calidad de divulgación de CSR y CoE de empresas cotizadas en China categorizadas como privadas y de propiedad del Estado. Sus conclusiones subrayan que mayor calidad de divulgación de CSR reduce el Costo de Capital y dicha reducción es mayor en empresas cotizadas que no son de propiedad del Estado. Además, el que la divulgación sea no voluntaria o voluntaria no genera efecto alguno en la calidad de divulgación de CSR. En un contexto similar, Li & Liu (2018) analizan la calidad de divulgación de los índices de CSR tomando una muestra de empresas contaminantes cotizadas de China y concluyen que una mayor calidad de divulgación de CSR reduce el CoE. Contrariamente, dicha relación inversa es mayor cuando las firmas son de propiedad del Estado. La divulgación de información sobre ESG mediante reportes de sostenibilidad reduce el CoE de firmas cotizadas y dicha disminución es mayor en países bajo ley civil-codificada (Dhaliwal *et al.*, 2014). La divulgación y aseguramiento de reportes de sostenibilidad mediante firmas auditoras *Big 4*, disminuye drásticamente el CoE en comparación al aseguramiento de informes realizados por consultoras externas (Martínez-Ferrero & García-Sánchez, 2017). Finalmente y tomando

una muestra de 30 países, la divulgación sobre responsabilidad ambiental corporativa mitiga los pasivos ambientales y por ende el Costo de Capital, según El Ghoul *et al.*, (2018).

### Teoría de la Legitimidad

La Teoría de la Legitimidad se basa en la presión ejercida por diferentes *stakeholders*. En ese sentido, la firma busca legitimar sus operaciones adoptando un comportamiento socialmente responsable (De Villiers & Van Staden, 2006). Además, las organizaciones son catalogadas como legítimas cuando la sociedad percibe que dichas empresas defienden diferentes intereses sociales y no exclusivamente intereses corporativos (Miranda *et al.*, 2018). La divulgación de información sobre sostenibilidad representa para la firma sacrificar capital a corto plazo con el fin de generar retornos a largo plazo dado que promueve una imagen de reputación y buena voluntad hacia clientes y diferentes *stakeholders*, de acuerdo a Ng & Rezaee (2015). La demanda de aseguramiento en los informes de sostenibilidad (Zorio-Grima *et al.*, 2015) y la diseminación de reportes no financieros reduce el CoE, especialmente a medida que se aseguran los informes y se divulga en un nivel alto del GRI (Weber, 2018).

Finalmente, las “*sin firms*” (“empresas pecadoras”, pertenecientes al sector de juegos de azahar, tabaco, alcohol, explotación de minas, entre otros) generan externalidades negativas (Hong & Kacperczyk, 2009) razón por la cual se sienten presionadas en divulgar información de RSE necesaria para legitimarse, mejorar su imagen y reputación (Weber, 2018) y de ese modo reducir el CoE (El Ghoul *et al.*, 2011; Michaels & Grüning, 2017; Hmaittane *et al.*, 2019).

### Teoría de la Divulgación Voluntaria

La Teoría de la Divulgación Voluntaria considera que las empresas con buen desempeño financiero, divulgan información de forma voluntaria, pero necesaria para la toma de decisiones por parte de los *stakeholders* (Verrecchia, 2001; Clarkson *et al.*, 2008; Zhang & Liu, 2020).

En ese sentido, la contribución de Zhou *et al.* (2017) tomando en cuenta una muestra de empresa que cotizan en el mercado bursátil de Johannesburgo, concluye que a

medida que se divulga información no financiera mediante el Reporte Integrado, se permite que los analistas mejoren sus estimaciones y además las firmas se benefician de menor Costo de Capital. La diseminación de emisiones de CO<sub>2</sub> mediante redes sociales permite que los inversores puedan tomar decisiones correctas en materia de inversión de capital (Albarrak *et al.*, 2019). De hecho, esta relación directa entre emisiones de CO<sub>2</sub> y el CoE se confirma tomando en consideración una muestra de empresas de Corea del Sur (Kim *et al.*, 2015) y una muestra de empresas en países desarrollados y subdesarrollados (Bui *et al.*, 2020). Finalmente, la diseminación voluntaria de las emisiones de CO<sub>2</sub> de firmas cotizadas en Sudáfrica incide en la reducción del CoE y por consiguiente, genera transparencia y sirve de motivación a las firmas para divulgar información relacionada con el cambio climático (Lemma *et al.*, 2019).

Algunos autores indican que las teorías anteriores pueden ser complementarias (como Martínez Ferrero y García-Sánchez, 2017) y ese es el enfoque del conjunto de nuestro compendio, si bien algunos trabajos sobre CoE se decantan por citar solo alguna de estas teorías (Garzón-Jiménez & Zorio-Grima, 2020).

### 1.4 Objetivos general y específicos

Esta tesis doctoral, por compendio de artículos, tiene un claro objetivo principal que consiste en analizar la relación entre el Costo de Capital y el comportamiento sostenible de las empresas. Se empleó el modelo *Price Earnings Growth* (PEG) de Easton (2004) para el cálculo del CoE considerando cero pago de dividendos. El resultado se obtiene de la raíz cuadrada de la diferencia en la proyección de ganancias por acción para el año 2 y año 1 dividido por el precio de la acción.

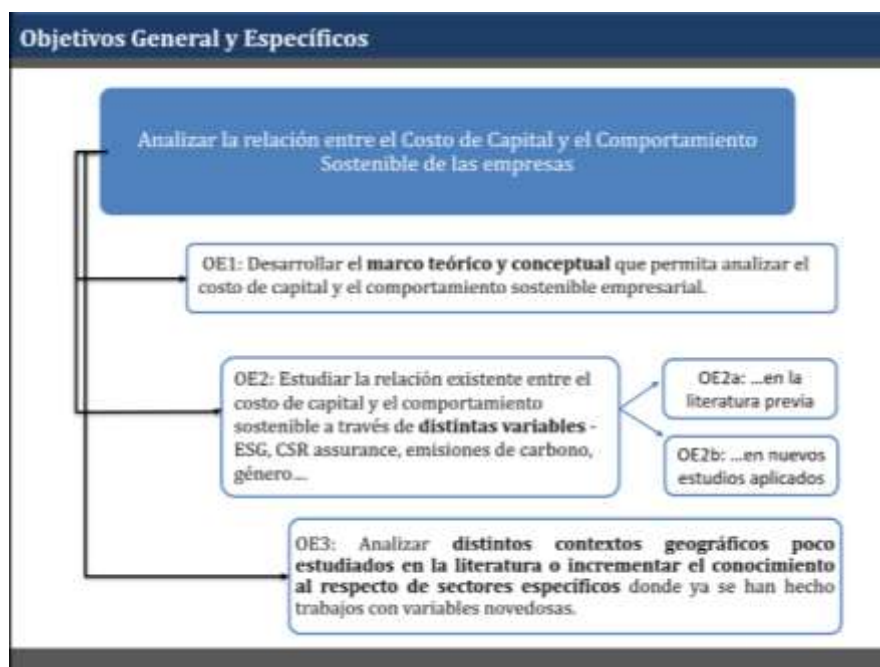
A continuación, se detalla la relación entre los objetivos específicos de la propuesta doctoral y los artículos publicados en revistas científicas recogidos como anexos.

- El primer objetivo específico (OE1) consiste en el desarrollo del marco teórico y el estudio de la literatura previa en este campo específico. Se ha abordado mediante una recopilación de artículos tomando en consideración un periodo de tiempo de 11 años. En ese caso, se procedió a analizar la metodología empleada por diferentes autores y el enfoque de sus estudios sobre el impacto de la divulgación de

actividades de CSR o información sobre sostenibilidad en el Costo de Capital de las empresas. Este objetivo es abordado en el anexo 1 de esta tesis.

- El segundo objetivo específico (OE2) estudia la relación existente entre el CoE y el comportamiento sostenible tomando en consideración diferentes variables, como los índices ESG, índices de desglose de tipo ambiental, la divulgación y aseguramiento de reportes de sostenibilidad, emisiones de dióxido de carbono e igualdad de género. Podríamos distinguir el estudio de esa relación en la literatura previa (OE2a), que se aborda en el anexo 1, así como el estudio aplicado en nuevos trabajos originales (OE2b), que se recogen en el anexo 2, anexo 3 y anexo 4.
- El tercer objetivo específico (OE3) analiza los diferentes contextos geográficos poco estudiados en la literatura e incrementa el conocimiento al respecto de sectores específicos donde ya se han realizado trabajos de Costo de Capital. Los artículos pertenecientes al anexo 2, anexo 3 y anexo 4 contemplan dicho objetivo.

**Figura 2** Objetivos generales y específicos de la tesis doctoral



En relación con el primer objetivo específico (OE1), en el primer artículo que consiste en una exhaustiva revisión bibliográfica, se ha considerado en su motivación la actualidad de las divulgaciones sobre información no financiera que exige la Directiva

2014/95/EU y la importancia de la divulgación sobre CSR de firmas cotizadas en mercados internacionales y su incidencia en el Costo de Capital. Posteriormente, se ha procedido a estudiar la metodología empleada por diferentes autores, así como los marcos teóricos, variables estudiadas, ámbitos geográficos y conclusiones, cubriendo de este modo el objetivo específico (OE2a). Todo ello sitúa al lector perfectamente en este campo de estudio y fue, de hecho, el punto de arranque de la investigación doctoral, sobre el que luego se encarrilaron el resto de trabajos del compendio.

Para el cumplimiento del segundo objetivo en su vertiente aplicada (OE2b), se redactaron tres artículos (anexos 2, 3 y 4). El primero trata sobre la emisión de reportes de sostenibilidad, un índice sobre desempeño en actividades de ESG, y el poder moderador sobre esta última variable del aseguramiento externo de los informes o la pertenencia al Mercado Integrado Latinoamericano (MILA) y la relación con el Costo de Capital. El segundo artículo analiza la relación entre las emisiones de dióxido de carbono, un índice de desempeño ambiental y el aseguramiento externo de la memoria de sostenibilidad con el CoE de una muestra de empresas pertenecientes al *Morgan Stanley Emerging Market Index*. Por último, en el artículo final se estudia el impacto sobre el CoE de la igualdad de género en el Consejo de Administración, un índice de desempeño ambiental y de las emisiones de CO<sub>2</sub> tomando en cuenta una muestra de firmas cotizadas del sector de alimentos y bebidas de todo el mundo.

Finalmente, para la culminación del tercer objetivo sobre obtención de evidencias en contextos poco estudiados (OE3), se realizaron los tres artículos mencionados en el párrafo anterior (anexos 2, 3 y 4). El primero de ellos realiza el estudio sobre una muestra de empresas cotizadas en Latinoamérica, el segundo sobre una muestra de empresas incluidas en un índice bursátil de mercados de capitales pertenecientes a países en vías de desarrollo de todo el mundo y el último sobre una muestra de empresas cotizadas pertenecientes al sector de alimentos y bebidas, ubicadas en países desarrollados y en vías de desarrollo. Vamos de ese modo abriendo la visión del estudio de un contexto geográfico regional próximo, continuando por países en desarrollo de todo el mundo y finalmente de empresas de todo el mundo, si bien de un sector muy concreto que es especialmente relevante en temas de sostenibilidad. Nótese que, hasta la fecha, no había trabajos específicos en el contexto de países no desarrollados y que nuestras aportaciones cubren pues un vacío importante en la literatura.

### 1.5 Metodología aplicada, resumen y resultados de artículos

El cumplimiento y desarrollo de los objetivos de la tesis doctoral se sustentan en un diseño que mezcla metodologías de tipo descriptivo y empírico, concretamente de tipo exploratorio, tal como se analiza a continuación.

El primer artículo recopila, y analiza en profundidad a través de un análisis de contenido, los estudios de diferentes autores que investigan la relación entre la sostenibilidad empresarial y el CoE tomando en cuenta empresas cotizadas a lo largo de 11 años (de 2008 a 2018).

El segundo, tercer y cuarto artículo utilizan una metodología exploratoria, de tipo empírico. Se implementan modelos econométricos para estudiar la relación de las variables objeto de interés sobre datos de panel dinámicos. Respecto a las bases de datos de donde se extrajeron las distintas variables, se utilizó *Thomson Reuters Eikon* para obtener variables de sostenibilidad y de control y la base de datos *I-B-E-S* para extraer las variables con las que calcular el CoE. En lo que se refiere al diseño econométrico, se emplearon dos metodologías: el método generalizado de momentos (GMM) para los artículos de los anexos 2 y 3 y un modelo de efectos fijos (FE), de acuerdo con el resultado del Test de Hausman en el artículo del anexo 4.

A continuación, se detallan los resúmenes y resultados de los cuatro anexos pertenecientes a esta tesis doctoral en la modalidad de compendio de artículos. Los resultados obtenidos nos permiten afirmar que se ha logrado el cumplimiento de los objetivos de esta tesis doctoral y aportar interesantes conclusiones en pro de mayores esfuerzos en temas de sostenibilidad dirigidas al sector empresarial, académico y gubernamental.

#### 1.5.1. Resumen del artículo del anexo 1.

El primer artículo tiene como propósito analizar la relación entre el Costo de Capital y la Responsabilidad Social Empresarial, a partir de un estado del arte, en el que se hace



especial hincapié en el marco teórico, cuestiones metodológicas y de tipo contextual. Además, se aborda la variada implementación de diferentes modelos para el cálculo del CoE y las distintas variables de sostenibilidad tomando en cuenta el contexto internacional o contextos locales. Este estudio fue la base inicial, como ya se ha comentado, para el desarrollo de la propuesta de investigación novedosa sustentada en fundamentos científicos, que se cubre en esta tesis doctoral.

Para la obtención de la muestra de artículos, se realizó una búsqueda en la *Web of Science* y Google Académico empleando las palabras “*sustainability*”, “*corporate social responsibility*”, “*csr*”, “*cost of equity*” y “*cost of capital*”. Así, se obtuvieron 22 artículos en el periodo 2008 a 2018 con altas citaciones, que fueron medidas hasta una fecha de corte al 25 de febrero del 2020. Entre ellos cabe mencionar los siguientes artículos por el elevado número de citas recibidas. Dhaliwal *et al.*, (2011) cuentan con 680 citaciones y concluyen que las empresas cotizadas en Norte América con alto Costo de Capital en años anteriores inician un proceso de divulgación de CSR, lo que reduce su CoE en los siguientes años y permite la atracción de analistas e inversionistas institucionales. En el mismo contexto, El Ghoul *et al.*, (2011) con 475 citaciones, concluyen que firmas cotizadas en EEUU con mejores indicadores de CSR reducen su CoE, mientras que la pertenencia al grupo de firmas conocidas como pecadoras (*sin firms*”), como por ejemplo tabacaleras, bebidas alcohólicas o casinos, tiende a suponer mayor CoE.

En un contexto internacional, podemos destacar por ejemplo el artículo de Kim *et al.* (2015), con 20 citaciones, quienes concluyen que existe una relación positiva entre el CoE y las emisiones de CO<sub>2</sub> por parte de empresas que cotizan en el mercado bursátil de Corea del Sur con independencia de que dichas empresas divulguen reportes de sostenibilidad o no. En términos generales, nuestros resultados indican que la divulgación sobre responsabilidad social empresarial de empresas cotizadas reduce el CoE, si bien dentro de la revisión realizada existen algunos resultados contradictorios o no significativos. Por ejemplo, Richardson & Welker (2001) encuentran un vínculo positivo entre el CoE y la divulgación de tipo social, contrario a lo esperado, y Suto y Takehara (2017) y Eom y Nam (2017) obtienen evidencia no concluyente.

En los siguientes apartados del artículo, se traza en primer lugar un detallado análisis de los distintos marcos teóricos empleados en los 22 artículos analizados,

resaltando que resultan complementarios y, de hecho, varios de los trabajos analizados optan por adscribir sus investigaciones a dos o más teorías. Se estudia también el abanico de metodologías empleadas por estos autores, mayoritariamente análisis de regresión (mínimos cuadrados ordinarios, generalizados o en dos etapas- por sus siglas en inglés, OLS; GLS; 2SLS), si bien los trabajos más recientes tienden a emplear el modelo generalizado de momentos (GMM, por sus siglas en inglés) para controlar posibles efectos de endogeneidad.

Otra sección del trabajo estudia las variables dependientes *ex ante* (en 20 de los 22 trabajos analizados) y *ex post* (solo en 2 trabajos), las independientes viendo la diversidad de posibilidades con las que puede medirse un comportamiento sostenible, y las distintas variables de control, así como los contextos geográficos y sectoriales analizados por los distintos autores.

Finalmente, se plantean futuras líneas de investigación como, por ejemplo, el estudio de cómo las divulgaciones sobre cambio climático y la implementación de los ODS 2030 o el aseguramiento externo puede influir en el CoE de empresas cotizadas, además de sugerir la ampliación del radio de estudio a regiones como Latinoamérica y África.

### **1.5.2. Resumen del artículo del anexo 2.**

El segundo artículo, de carácter exploratorio y empírico, estudia la relación entre el CoE mediante el modelo de Easton (2004), empleado para el cálculo de la variable dependiente y cuatro variables de sostenibilidad tomando en consideración la publicación de reportes de sostenibilidad, el índice ESG, y el efecto moderador de la relación entre el aseguramiento de empresas y el índice ESG sobre el CoE, así como la relación moderadora entre los índices ESG y la pertenencia al Mercado Integrado Latinoamericano (MILA) sobre el CoE de empresas cotizadas latinoamericanas.

Se utilizó *Thomson Reuters Eikon e I-B-E-S* y se obtuvo una base de datos de panel dinámico no balanceado tomando en cuenta una capitalización bursátil mayor a cuatro mil millones de dólares. La muestra comprende 252 empresas cotizadas de Latinoamérica y 2,772 observaciones considerando un periodo de tiempo entre el 2008 y 2018. Se empleó el modelo GMM necesario para controlar posibles efectos de endogeneidad, es decir, la

relación causal entre la variable dependiente y el valor residual del modelo según Arellano & Bond (1991). Adicionalmente, se emplearon pruebas para medir la sobreidentificación de coeficientes y la autocorrelación de errores según Blundell & Bond (1998) instrumentado en Stata por Roodman (2009).

En relación con los resultados obtenidos en nuestro trabajo, hay que destacar que existe una relación inversa entre la divulgación de índices ESG y el Costo de Capital. La divulgación de reportes de sostenibilidad de forma voluntaria incide asimismo en una reducción del CoE, lo que puede indicar que los costos de asimetría de información entre la gerencia y los accionistas se reducen, de acuerdo a Healy & Palepu (2001). Además, dichos resultados son coherentes con las aportaciones de Dhaliwal *et al.*, (2014) y Michaels & Grüning (2017).

Por otra parte, se observa que el aseguramiento de los reportes de sostenibilidad unido a un buen comportamiento sostenible en términos de ESG, disminuye el CoE en línea con los estudios de Martínez-Ferrero & García-Sánchez (2017) y Weber (2018). Finalmente, la variable moderadora que combina los índices de ESG y la pertenencia al MILA, disminuye también el CoE.

Las conclusiones de este artículo son relevantes dado que hasta la actualidad no se ha desarrollado un estudio que mida la relación entre la sostenibilidad de las empresas cotizadas latinoamericanas y CoE. Además, la aportación nuestro trabajo puede ser un acicate para que los entes reguladores promuevan políticas de divulgación y aseguramiento en materia de sostenibilidad, se mejore la integración entre los mercados, y en última instancia las empresas puedan acceder a fuentes de capital por parte de fondos de inversión responsables (Reverte, 2012; Gupta, 2018).

### **1.5.3. Resumen del artículo del anexo 3.**

El tercer artículo usa una metodología exploratoria para analizar la relación entre el CoE de empresas cotizadas incluidas en el índice *Morgan Stanley Emerging Market Index* y las emisiones de CO<sub>2</sub> (alcance 1, emisiones directas, y alcance 2, emisiones indirectas generadas por la electricidad consumida), un índice de comportamiento de tipo ambiental y finalmente, la publicación de reportes de sostenibilidad asegurados externamente.

Se elaboró una base de datos de panel dinámico no balanceado empleando *Thomson Reuters Eikon* tomando en consideración que la capitalización bursátil fuera mayor a 4 mil millones de dólares. Ello nos permitió obtener una muestra con 5.328 observaciones de 929 empresas procedentes de 30 países emergentes desde el 2014 hasta el 2019.

Se implementó un modelo multivariable mediante GMM de acuerdo a Arellano & Bond (1991) y Blundell & Bond (1998), necesario para controlar la existencia de una posible relación causal entre la variable dependiente y el error residual.

Los resultados indican que existe una relación positiva entre las emisiones de CO<sub>2</sub> y CoE, penalizando los retornos que exigen los accionistas si la empresa genera mayor contaminación ambiental. La conclusión obtenida guarda pertinencia con los resultados de Kim *et al.*, (2015) y Bui *et al.*, (2020). Dicha relación puede ser mitigada mediante la divulgación de información ambiental lo cual reduce el CoE según El Ghoul *et al.*, (2018) y Gupta (2018) y así lo confirman nuestros resultados a través de la variable sobre comportamiento ambiental. Asimismo, obtenemos evidencia de que el aseguramiento del informe de sostenibilidad por parte de empresas externas reduce el CoE, lo que está en línea con Martínez-Ferrero & García-Sánchez (2017) y Weber (2018).

La contribución de nuestro estudio destaca por su interés para promover la mitigación de las emisiones de CO<sub>2</sub> de alcance 1 y alcance 2 de empresas ubicadas en países emergentes mediante la divulgación de información de tipo ambiental (inversión en productos o procesos productivos amigables para el medio ambiente, reducción de pasivos ambientales) y la emisión voluntaria de reportes de sostenibilidad debidamente asegurados por terceros, externos a la firma.

Además, los estudios hasta la fecha se han enfocado en la relación entre las emisiones de CO<sub>2</sub> y ratios financieros y contables, pero no propiamente en el contexto de mercados emergentes y con la variable Costo de Capital como indicador del perfil de riesgos que perciben los accionistas (GRI & SASB, 2021). Nuestro estudio, dentro de un contexto bursátil emergente, contribuye a promover a través de una mayor transparencia ambiental la eliminación de los costos de agencia en países emergentes donde la información financiera y no financiera tiende a ser más opaca, facilitándose así que exista

una relación directa entre la gerencia de la firma y diferentes *stakeholders*. Además, ello facilitaría que fondos de inversión socialmente responsable invirtieran en dichas empresas atraídas por su mayor sostenibilidad y transparencia. Finalmente, los hallazgos obtenidos pueden ser usados como ya se ha dicho para animar a las empresas a tener comportamientos responsables, favoreciendo el cumplimiento del ODS 13 relacionado con el Cambio Climático, para facilitar la reducción de la temperatura global de acuerdo con el Acuerdo de París.

### 1.5.4. Resumen del artículo del anexo 4.

El cuarto artículo deja de centrarse en países subdesarrollados para marcarse como objetivo estudiar en el sector de alimentos y bebidas, un sector especialmente interesante a efectos de sostenibilidad, la relación entre el CoE y tres variables de comportamiento sostenible. La primera de ellas es el comportamiento sostenible a nivel ambiental, la segunda la emisión de CO<sub>2</sub> y finalmente, el porcentaje de participación del género femenino dentro del Consejo de Administración.

La muestra está compuesta por empresas cotizadas pertenecientes al mencionado sector, obteniendo una base de datos de panel no balanceado mediante *Thomson Reuters Eikon* e *I-B-E-S*. La muestra considera una capitalización bursátil no inferior a 9.500 millones de dólares, lo que ha supuesto incluir en dicha muestra a 142 firmas cotizadas, totalizando 1.562 observaciones procedentes de 35 países, tanto desarrollados como emergentes, tomando un periodo de tiempo de 11 años (2009 al 2019). Esta investigación amplía el estudio elaborado por Raimo *et al.*, (2020) que analiza la relación entre información sobre ESG de empresas cotizadas del sector de alimentos y bebidas y el CoE de una muestra de empresas todas ellas ubicadas en países desarrollados.

Se empleó un modelo econométrico de efectos fijos (FE) de acuerdo con el resultado del Test de Hausman necesario para controlar la relación causal entre la variable independiente y el error residual (Hausman, 1978).

Los resultados obtenidos por nuestro estudio indican, en primer lugar, que a medida que existe un mejor comportamiento en cuestiones ambientales, el CoE disminuye. En

segundo lugar, se aprecia que las emisiones de CO<sub>2</sub> tomando en consideración el alcance uno y el alcance dos, incrementan el CoE penalizando el inversionista los retornos que va a exigir a la empresa ante mayores niveles de emisiones de carbono. Finalmente, una mayor participación del género femenino dentro del Consejo de Administración de las empresas pertenecientes al sector de alimentos y bebidas reduce el CoE.

Entre las contribuciones del artículo, cabe señalar que promueve herramientas para el cumplimiento de los ODS 2030 y para revertir las externalidades negativas que el sector objeto de estudio genera. Así cabe destacar que el ODS 12 “Consumo y Producción Responsable” considera la eliminación de 1.3 miles de millones de toneladas de desperdicio de alimentos además de considerar una nueva métrica para el consumo de recursos naturales (United Nations, 2020). Además, con respecto al ODS “Cambio Climático” hay que destacar que el sector de alimentos y bebidas es responsable del 30% total de emisiones totales de CO<sub>2</sub> a nivel global (Clark *et al.*, 2020). Dicha conclusión va en línea con la asimetría en el consumo de energía dentro del sector agroindustrial, pues en países de África, el consumo de energía es del 55% en comparación al 15.7% demandado por firmas de los EEUU (Clairand *et al.*, 2020). Si alentadas por esa reducción en CoE evidenciada por nuestro trabajo, las empresas del sector de alimentos y bebidas invierten en prácticas más responsables y nueva tecnología en el desarrollo y mejora de la cadena de suministro, las emisiones de CO<sub>2</sub> se reducirán. Finalmente, una mayor aportación del género femenino dentro del Consejo de Administración, incide en una reducción del CoE lo cual va en línea con los hallazgos obtenidos tanto para muestras de países desarrollados (Hossain & Kryzanowski, 2020; Nguyen, 2020) como países emergentes (Srivastava *et al.*, 2018) y guarda relación con el cumplimiento del Objetivo 5 “Igualdad de Género”. Dicho efecto y tomando en consideración la obligatoriedad en ciertos países de cumplir una cuota de género dentro del Consejo de Administración, supone que la participación del género femenino reduce riesgos financieros (como vemos en nuestro trabajo a través de la variable CoE), pero otros autores también observan que incrementa la rentabilidad de dichas firmas y reduce prácticas de conservadurismo en relación a empresas ubicadas en países donde existe menor igualdad de género (Belaounia *et al.*, 2020).

### 1.6 Conclusiones

Se procede a exponer las siguientes conclusiones de esta investigación doctoral por compendio de artículos, recogidos en los anexos 1 a 4.

**El Costo de Capital es un indicador financiero de creciente interés para las empresas, la academia y los reguladores, que se preocupan por el comportamiento sostenible.**

El concepto de Costo de Capital se define como la tasa de retorno que los inversores esperan obtener a largo plazo al sacrificar recursos a corto plazo (Garzón Jiménez & Zorio-Grima, 2021b).

El estudio de esta magnitud en la literatura es relativamente reciente, empezando en los primeros años del milenio. Son diferentes las aproximaciones que hacen los distintos autores, siendo más frecuentes los modelos ex ante en la literatura. De hecho, ese es el enfoque que adoptamos en nuestro trabajo, siguiendo el *Price Earnings Growth Model* de Easton (2004).

La literatura previa ha realizado numerosas aportaciones, fundamentalmente en mercados desarrollados, en las que mayoritariamente se evidencia que un comportamiento sostenible de las empresas reduce su Costo de Capital.

El propio *Sustainability Accounting Standards Board* (SASB) menciona el Costo de Capital como un indicador de riesgo importante que sus estándares de sostenibilidad tienen presente para identificar los riesgos y oportunidades que puedan afectar a las empresas en el ámbito del comportamiento responsable (GRI & SASB, 2021).

**La relación entre un buen comportamiento sostenible (medido a través del índice ESG o el índice de tipo ambiental) y el Costo de Capital es negativa.**

El índice de tipo ambiental, social y de gobierno corporativo es una variable que captura información de sostenibilidad divulgada fundamentalmente de forma voluntaria en el contexto en que realizamos nuestra investigación. En este sentido, en nuestro artículo del

anexo 2, usamos un índice que considera los siguientes pilares: uso sustentable de recursos naturales, manejo de desechos, respeto a los derechos humanos, implementación de estrategias de responsabilidad social corporativa, combate contra la corrupción, relación con la comunidad, capacitación de la fuerza laboral, e innovación, entre otros ítems. En los artículos de los anexos 3 y 4, hemos utilizado otros índices solo de desempeño ambiental, como por ejemplo el que tiene en cuenta la tecnología para reducir los gastos ambientales, desarrollar productos ecológicos y servicios, reducir las externalidades o minimizar los impactos en los sistemas.

Con todo, nuestros resultados nos permiten concluir que el Costo de Capital disminuye a medida que existe mejor comportamiento sostenible medido por el índice ESG tomando en consideración una muestra de empresas de Latinoamérica, de acuerdo a los resultados del artículo del anexo 2, lo que guarda pertinencia con las contribuciones de Feng *et al.*, (2015); Gupta (2018) y Li & Liu, (2018) eliminando asimetrías de información y permitiendo captar recursos de fondos de inversión socialmente responsables. Dicho resultado se ratifica al considerar que el índice ambiental reduce el CoE de empresas cotizadas en países emergentes de todo el mundo (artículo del anexo 3), en línea con Sharfman & Fernando (2008) y El Ghouli *et al.*, (2018).

El artículo del anexo 4 de la propuesta doctoral concluye igualmente que existe una relación inversa entre el índice ambiental y el CoE de empresas cotizadas del sector de alimentos y bebidas. Dicha propuesta expande las conclusiones de Raimo *et al.*, (2020) dado que nuestro estudio considera una muestra de empresas no solo en países desarrollados sino también en países emergentes. Uno de los desafíos del sector de alimentos y bebidas es el consumo excesivo de energía proveniente de fuentes no renovables lo cual repercute en un deterioro de las tasas de eficiencia energética (Bhadbhade & Patel, 2020) y en la necesidad de promover una transición hacia tecnologías amigables con el medio ambiente y una reducción de desperdicios en la cadena de producción de alimentos (Espinosa *et al.*, 2021).



### Las emisiones de CO2 incrementan el Costo de Capital.

Gracias a iniciativas como el GRI, el CDP u otros organismos relacionados con la emisión de información no financiera relevante para luchar contra el cambio climático, es cada vez más frecuente que las firmas implementen sistemas de medición de emisiones de carbono, con los que conocer y poder gestionar y reportar sus impactos de carbono. En nuestra investigación medimos estas emisiones a través del logaritmo natural del total de emisiones de dióxido de carbono considerando el alcance uno (emisiones directas) y alcance dos (emisiones indirectas debidas a la electricidad consumida).

Nuestras conclusiones indican que mayores emisiones de CO2 por parte de empresas cotizadas conducen a mayores niveles de CoE. Dicha relación es coherente con los resultados de Kim *et al.*, (2015) y Bui *et al.*, (2020). Las emisiones de carbono penalizan al inversionista dado que se le exigen mayores retornos a la empresa lo que podría reducir su valor de mercado, además de alejarnos de cumplir las metas planteadas del Acuerdo de París y el Objetivo 13 de los ODS. Esta relación del CoE con las emisiones de CO2 se evidencia para las empresas que cotizan en mercados emergentes (artículo del anexo 3) y empresas del sector de alimentos y bebidas (artículo del anexo 4).

El primer paso para que los accionistas y los mercados puedan valorar la sostenibilidad de las empresas en términos de carbono, requiere medir y divulgar estos datos. La divulgación de las emisiones de CO2 elimina asimetrías de información siendo las firmas penalizadas al no divulgar dicha información (Matsumura *et al.*, 2014). Además, la divulgación y la calidad de información en materia de emisiones de CO2 por medio del CDP (Lemma *et al.*, 2019) y el uso de redes sociales (específicamente Twitter según Albarrak *et al.*, 2019) permite que exista una mayor diseminación de información hacia los *stakeholders*.

Es interesante destacar la actualidad de esta conclusión, pues la propuesta de la Unión Europea trata de reducir las emisiones de CO2 para tener una economía neutra en carbono en 2050 (European Commission, 2021). No obstante, vemos que incluso en otros ámbitos regionales como los estudiados en nuestro trabajo, el efecto de los mercados en el Costo de Capital puede ayudar a lograr avances también en este ámbito a través de un comportamiento voluntario por parte de las empresas que busque reducir el CoE.

### **La Integración de mercados bursátiles promueve el impacto positivo de un comportamiento sostenible en el Costo de Capital.**

El Mercado Integrado Latinoamericano (MILA) representa la unión de los mercados bursátiles de México, Colombia, Perú y Chile. En ese caso, las transacciones bursátiles pueden realizarse sin necesidad de incurrir en costos por compra o venta de divisas. Durante el periodo 2014 hasta el 2019, la capitalización bursátil combinada del MILA fue de 7.576 miles de millones de dólares (Federación Iberoamericana de Bolsas, 2020).

Una de las conclusiones innovadoras de esta tesis consiste en evidenciar, entre las empresas que cotizan en MILA, la generación de un efecto moderador negativo entre la divulgación de índice ESG sobre el CoE. Dicha conclusión es novedosa dado que hasta la fecha no se ha realizado un estudio que analice la relación entre la sostenibilidad y el CoE considerando la integración de mercados bursátiles.

Dicha interacción se encuentra sustentada en la reducción de la volatilidad de precios e incremento de la base de inversores que proporciona la integración de mercados (Singh, 2009). Además, la libre transacción de acciones en el mercado regional permite que inversionistas locales y extranjeros puedan diversificar sus portafolios obteniendo rendimientos correlacionados (Mellado & Escobari, 2015; Espinosa-Méndez *et al.*, 2017).

Así pues, nuestros resultados señalan que la cotización en el MILA potencia el efecto de la sostenibilidad sobre la reducción del retorno que exigen los accionistas. Ello sin duda es positivo para seguir avanzando en la integración de mercados emergentes. No olvidemos que normalmente se trata de contextos en los que es necesario un mayor esfuerzo por proteger el entorno, las condiciones sociales, la naturaleza y este respaldo de los mercados puede ser visto por las propias empresas como el mejor incentivo en mantener y mejorar su comportamiento sostenible.

### Participación de mujeres en el Consejo de Administración

El Consejo de Administración es un mecanismo que permite reducir asimetrías de información entre la gerencia y los accionistas de la firma (Belaounia *et al.*, 2020). Esta tesis doctoral considera la participación del género femenino dentro del Consejo como un elemento proxy adicional con el que medir un comportamiento sostenible de las empresas. En ese caso, la literatura indica que la igualdad de género permite que el Consejo implemente prácticas de monitoreo exhaustivas (Adams & Ferreira, 2009), siendo las empresas con más mujeres en su Consejo menos propensas a cometer fraudes financieros (Cumming *et al.*, 2015). Otros trabajos evidencian que una mayor participación del género femenino reduce la volatilidad del precio de la acción dada la calidad en toma de decisiones (Jizi & Nehme, 2017).

En lo concerniente a esta propuesta doctoral, en nuestro último trabajo del anexo 4 se evidencia que una mayor proporción del género femenino dentro del Consejo de Administración reduce el CoE de las empresas cotizadas pertenecientes al sector de alimentos y bebidas. Dicha conclusión va en línea con las contribuciones de Hossain & Kryzanowski (2020) y podría servir para respaldar cuotas de participación obligatoria, como sugieren Nguyen (2020) y Srivastava *et al.*, (2018).

Nuestra aportación expande las conclusiones de Raimo *et al.*, (2020), quienes consideran una muestra de empresas del mismo sector pero en países desarrollados y utilizando como proxy de comportamiento sostenible el índice ESG. Nuestra aportación añade más variables de estudio y permite inferir que las firmas pertenecientes al sector de alimentos y bebidas, necesarias para la supervivencia humana, pueden reducir la brecha de igualdad de género cumpliendo con el objetivo cinco de los ODS.

Con todo, esta tesis muestra que una mayor igualdad de género permite reducir asimetrías de información y el CoE, por lo que la evidencia puede ser útil para que los reguladores puedan proponer políticas en materia de gobernanza enfocadas en favorecer la igualdad de género.

### **La divulgación y aseguramiento de los reportes de sostenibilidad inciden en una reducción del CoE.**

La memoria de sostenibilidad consiste en un documento que reporta información ambiental, social y de gobierno corporativo dirigido a diferentes grupos de interés. Dicho informe permite eliminar asimetrías de información (Healy & Palepu 2001; Dhaliwal *et al.*, 2014), rindiendo cuentas de las inversiones ambientales y actividades sociales realizadas por la firma y generando una imagen sostenible (Aras & Crowther, 2009). Esta memoria reporta diferentes iniciativas ambientales, sociales y de gobernanza permitiendo al inversor estimar el valor de mercado de la firma (Dhaliwal *et al.*, 2014). Lógicamente el aseguramiento de estos informes de sostenibilidad por agentes externos incrementa la credibilidad de dichos informes (Global Reporting Initiative, 2013, Zorio *et al.*, 2012).

En esta tesis doctoral, la variable divulgación voluntaria de reportes no financieros es de orden categórico siendo uno si emite reportes y cero en caso contrario (artículo del anexo 2). Si los informes están asegurados por profesionales externos a la empresa se usa otra variable categórica para indicar dicha circunstancia (artículos del anexo 2 y 3).

Nuestros hallazgos indican que la emisión de informes de sostenibilidad (artículo del anexo 2) reduce el CoE. Asimismo, observamos que el aseguramiento de dichos informes reduce el CoE a través del efecto moderador sobre el índice ESG (artículo del anexo 2, sobre Latinoamérica) siendo consistentes con Li & Foo (2015), Dhaliwal *et al.*, (2014) y Michaels & Grüning (2017). En nuestro artículo del anexo 3, de nuevo se obtiene evidencia de que el aseguramiento de los informes reduce el CoE, ahora en una muestra de empresas de países emergentes, lo que está en línea con los resultados de Casey & Grenier, (2015) y Martínez-Ferrero & García-Sánchez (2017).

Esta conclusión es especialmente interesante en el momento actual en el que la Unión Europea está revisando la Directiva 2014/95/EU. De hecho, en el documento de propuesta de nueva Directiva (European Commission, 2021), se propone alentar un proceso progresivo no obligatorio considerando unos mínimos requisitos en materia de aseguramiento de informes de sostenibilidad (inicialmente de tipo limitado para en un futuro estadio pedir a las empresas un aseguramiento de tipo razonable). Igualmente, el nombramiento del GRI como co-constructor de las normas europeas de sostenibilidad junto

con el propio EFRAG (EFRAG, 2021), nos hace pensar que efectivamente la tendencia de emitir informes de sostenibilidad y asegurarlos seguirá al alza, impulsada por Europa, llegando a otras áreas del mundo como las analizadas en esta tesis. A la luz de nuestros resultados, cabe esperar que con ello, al divulgar información no financiera, las firmas se beneficien de mayor liquidez (Verrecchia, 2001), mejoren sus retornos financieros (Malik, 2015) y reduzcan su Costo de Capital, como se concluye en esta tesis.

**Las variables de control utilizadas en nuestros trabajos se evidencian en ocasiones significativas para explicar el comportamiento del CoE.**

La literatura previa que analiza el impacto del comportamiento sostenible sobre el Costo de Capital tiene en consideración un conjunto variado de variables de control. Esta investigación doctoral utiliza también distintas variables de control, de las que pasamos a destacar las conclusiones siguientes.

La variable BETA toma en consideración el riesgo sistémico de firmas cotizadas. En ese sentido, nuestros resultados indican que existe una relación directa con CoE lo cual se traduce en que, a mayor riesgo, el costo es mayor. Dicho resultado es expuesto en el anexo 2 (niveles de significancia del 1% y 5%) anexo 3 (nivel de significancia del 10%) y guarda congruencia con los resultados Breuer *et al.*, (2018); Ahmed *et al.*, (2019); Albarrak *et al.*, (2019) y Bui *et al.*, (2020).

Las variables denominadas SIZE o MKTCAP en nuestros trabajos recogen el logaritmo natural de la capitalización bursátil, es decir, el valor de mercado de la acción multiplicado por el número de acciones negociables. Nuestras conclusiones indican que las firmas con mayor capitalización bursátil tienen menor CoE. Dicho resultado está sustentado en el anexo 2 y 3 (nivel de significancia del 5%), y guardan relación con las contribuciones Dhaliwal *et al.*, (2014) y Ng & Rezaee (2015), si bien la variable no resulta significativo en nuestro estudio del anexo 4.

La variable LEVERAGE mide el nivel de endeudamiento de la firma tomando en cuenta el total de pasivos dividido por el patrimonio. En ese caso, nuestras conclusiones

indican que existe una relación directa positiva entre endeudamiento y CoE. Así, en el anexo 2 demostramos que las firmas cotizadas de Latinoamérica con mayor nivel de deuda, tienen mayor Costo de Capital dado el riesgo de no cumplir con sus obligaciones financieras. Dichos resultados están alineados con las contribuciones de Kim *et al.*, (2015); Martínez-Ferrero & García-Sánchez (2017); Gupta (2018) y El Ghouli *et al.*, (2018).

La variable que captura la rentabilidad en nuestros trabajos es el ROA (rentabilidad económica, en los anexos 2 y 3) o el ROE (rentabilidad financiera, en el anexo 4). Nuestros resultados al respecto no son concluyentes pues evidenciamos que existe una relación directa con el Costo de Capital de acuerdo al anexo 3 (nivel de significancia del 1% y 5%) lo cual va de la mano con las conclusiones de Li *et al.*, (2017) y Gupta (2018), pero no resulta significativa esta variable en el anexo 2 (como en algunos de los modelos testados por Li & Foo, 2015), o la relación es negativa en el anexo 4.

Finalmente, nuestra variable BTM es el resultado del cociente del valor de mercado sobre el valor en libros, que según los resultados obtenidos en el anexo 2 incrementa el CoE, de forma consistente con El Ghouli *et al.*, (2018), si bien no se revela significativo en el estudio del anexo 3.

### 1.7 Limitaciones y futuras líneas de investigación

Nuestra propuesta conformada por un compendio de cuatro artículos de investigación ya publicados tiene las siguientes limitaciones. En primer lugar, la obtención de bases de datos de panel dinámico no balanceado mediante *Thomson Reuters Eikon*, mostró que cierta información en materia de sostenibilidad es limitada o incompleta. En segundo lugar, la información requerida para el cálculo del Costo de Capital por medio de *I-B-E-S* no estaba disponible para ciertas firmas, por lo que lógicamente tuvieron que ser excluidas de la muestra. En tercer lugar, los indicadores en materia de sostenibilidad obtenidos de *Thomson Reuters Eikon* podrían ser no consistentes con los que se obtienen de otras bases de datos (por ejemplo *Bloomberg*) según Freiberg *et al.*, (2020).

Llegado este punto, cabe realizar ahora algunas reflexiones finales tras haber estudiado en distintos contextos la relación entre el comportamiento sustentable y el Costo

de Capital de firmas cotizadas y, a partir de ahí, realizar algunas propuestas para la investigación futura.

Para lograr una economía sustentable es necesaria la participación activa del sector público y privado-empresarial. En ese sentido, el primero deberá cumplir con diferentes compromisos internacionales promoviendo políticas en materia de divulgación de información no financiera. Podemos resaltar el *European Green Deal* propuesto por la Comisión Europea en el que adquiere un papel muy relevante el EFRAG. Este tipo de propuesta podría ser tomada como referente en otras regiones como Latinoamérica y Asia en donde el sector empresarial sustentable necesita igualmente vías de financiación. Iniciativas de este calado permitirían una mayor cohesión social y respeto medioambiental a través de reportes de sostenibilidad y su aseguramiento externo para dotarlos de mayor credibilidad.

En relación al sector empresarial que representa el motor más dinámico de la economía, cabe esperar que, gracias a la inercia generada y las evidencias aportadas por estudios como los de esta tesis, se busque adoptar un comportamiento cada vez más sustentable y se le dé visibilidad al mismo entre sus *stakeholders* mediante la emisión de informes de sostenibilidad. Dicho comportamiento, a la luz de nuestros resultados, permitirá una reducción del CoE y favorecerá la llegada de capitales de fondos de inversión socialmente responsables, que sacrifican recursos en materia de inversión a corto plazo con el propósito de invertir en proyectos a largo plazo, que finalmente, sean un catalizador del cumplimiento de los ODS de la Agenda 2030 de Naciones Unidas.

El cumplimiento de los objetivos planteados en esta propuesta doctoral permite dar ahora un paso adelante con la idea de seguir profundizando en futuras investigaciones en materia de sostenibilidad de países emergentes o poco explorados. En este sentido, proponemos elaborar estudios de orden exploratorio y empírico, tomando en cuenta la divulgación de información de CSR y vencimiento de deuda (Benlemlih, 2017), costo de deuda (Bhuiyan & Nguyen, 2020), acceso a capitales financieros considerando la calidad y aseguramiento de la información de RSC (Cheng *et al.*, 2014; García-Sánchez *et al.*, 2019), la divulgación voluntaria del reporte integrado como catalizador en la divulgación de información voluntaria por firmas ubicadas en países emergentes (Zhou *et al.*, 2017), el cumplimiento progresivo de los ODS 2030 (Martínez-Ferrero & García-Meca, 2020) o la

divulgación ambiental de firmas contaminantes y su efecto moderador en la estimación de analistas y CoE (Yao & Liang, 2019).

Respecto al sector de alimentos y bebidas, sería interesante abordar el efecto en el CoE del aseguramiento de los informes de CSR, la medición de uso de recursos hídricos (Weber & Saunders-Hogberg, 2020), la implementación de prácticas de producción respetuosas con el medio ambiente (Rahim & Raman, 2015; Espinosa *et al.*, 2021) o el estudio de la incidencia del COVID-19 en indicadores financieros, contables y en el Costo de Capital. Por último, no podemos dejar de referirnos a las oportunidades para la investigación futura que puede ofrecer la implementación de *blockchain* como herramienta de transparencia y su incidencia en sostenibilidad empresarial, gobierno corporativo, ética empresarial y conservación de recursos naturales de firmas en países emergentes (Ronaghi & Mosakhani, 2021), además de su contribución al desarrollo de una economía circular reduciendo la huella de carbono, disminución de costos de transacción, mejoras en la cadena productiva y de los derechos humanos (Upadhyay *et al.*, 2021).



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**ANEXO 1. CORPORATE SOCIAL RESPONSIBILITY AND COST  
OF EQUITY: LITERATURE REVIEW AND SUGGESTIONS FOR  
FUTURE RESEARCH**



# Anexo 1. Corporate Social Responsibility and cost of equity: Literature review and suggestions for future research

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## Corporate Social Responsibility and Cost of Equity: Literature Review and Suggestions for Future Research

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**Abstract:** Listed companies have become increasingly aware not only of the importance of being socially responsible but also about reporting their initiatives in this field. Existing research has investigated many of the impacts of the sustainable profile of companies on a wide range of financial dimensions. The link between the cost of equity and sustainability is extremely timely as it can have great potential in reinforcing good practices regarding sustainable engagement amongst listed companies, which can also be regarded as trendsetters by other types of companies and institutions. This paper presents a thorough literature review of 22 articles focused on the link between sustainability and the cost of capital. The main contribution of this study is the broad scope of the literature review not only regarding the number of papers revised but also the provided details and their systematisation, such that future researchers in the field can easily identify the references regarding, for instance, different theoretical approaches. The methodologies that have been used to test the hypotheses as well as how the cost of equity is proxied by the different authors is presented together with the independent variables for measuring the sustainable profile of companies as well as the control variables. Our literature review also pays special attention to the different regional settings where research has examined the link between the cost of equity and sustainability and presents new ideas for studies in the field in order to open up future avenues for research.

**Keywords:** cost of equity; CSR; sustainability; literature review

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# Anexo 1. Corporate Social Responsibility and cost of equity: Literature review and suggestions for future research

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## 1. Introduction

Unethical business practices are nowadays under the spotlight, attracting the attention not only of the justice system but also of the media, due to the increasing awareness of the need to protect Planet Earth. Therefore, firms make significant efforts not only to take actions to protect the environment, the quality of life of their workers, and local communities but also to communicate those initiatives to a wide range of stakeholders, including, of course, the shareholders, as many of these firms have trade shares in international equity markets. All these actions are under the umbrella of the so-called corporate social responsibility (CSR) of companies.

Indeed, CSR must be understood under the “triple bottom line” approach explained by [Elkington \(1998\)](#), which expands on traditional corporate reporting to consider social and environmental performance in addition to financial performance. In addition, the acronym “Environmental, Social and Governance” (ESG) is commonly used to refer to CSR activities because these are the three most important factors when measuring corporate sustainable behaviour.

Many studies have analysed the relationship between the CSR of the companies listed in capital markets using a wide range of financial dimensions (for instance, information asymmetry, earnings management, audit fees, cost of debt, debt ratios or equity ratios). [Benlemlih \(2017\)](#) presents a broad literature review in all these different areas, referring to only six recent articles until 2014 on the specific topic of cost of equity (CoE). Note that CSR disclosure is a potential mediator of the CSR-CoE relationship, but not an indispensable one, and there may be other types of impact in corporate finance. For instance, the positive link between CSR and corporate financial performance (CFP) is also evidenced when companies with higher CSR scores have greater CFP reflected on return over assets ([Waddock and Graves, 1997](#)). CSR disclosure increments resources to finance profitable projects, thereby reducing capital constraints ([Cheng et al., 2014](#)) and increasing the firm’s market value, especially in weak equity and debt markets with higher transaction costs ([El Ghoul et al., 2017](#)). Hence, and especially for listed companies, CoE is a very powerful indicator in financing and strategical decision making. It represents the return or percentage gain capital providers will obtain by investing on the firm’s shares, which can be measured according to different definitions or proxies. These expected returns are valuable for capital budgeting, portfolio allocation, performance assessment, active risk control, and even firm valuation.

Our study is timely and valuable as this is a growing area of research and the latest literature review only revised six articles on CSR and CoE covering up to 2014 ([Benlemlih, 2017](#)). Note that the European Union requires greater disclosure of nonfinancial and diversity information by large companies ([Directive 2014/95/EU, 2014](#)). European countries have transposed this directive such that companies are required to include some nonfinancial information in their annual report or separate reports from 2018 onwards. Therefore, the new requirements imply a new setting where future research will try to assess the impact of increased CSR engagement on financial aspects such as CoE. In addition, companies might be even more willing to make new disclosures on sustainability if new evidence is found for the benefits of CSR regarding CoE reduction. Therefore, the contribution of this literature review study relies on its extension (22 articles), covering a wide time span from its origin in research (2001) up to the latest publications in 2018, at a time when more requirements for sustainability disclosure are being introduced in the European Union, and when there is also an increasing trend to inform about nonfinancial information around the world. Hence, the topic of CSR and CoE becomes even more attractive for future researchers, managers, or society as a whole.

The definitions and methodologies used to measure CoE are diverse, and there is also a wide range of variables measuring the sustainability profile of a company. Henceforth, the main purpose of this article is to present a literature review of the relationship between CSR and CoE on an international scale, focusing on the theoretical frameworks referred to, the methodologies employed, the different approaches to measure the cost of equity together with the sustainability measures and control variables, and the regional settings examined, with the aim of providing a base for future research.

The remainder of the paper is organized as follows. Section 2 explains the methodology employed to define the scope and sample of the studied articles. Section 3 describes different theoretical frameworks, the models implemented by authors to calculate the cost of equity, the independent variables required to measure the sustainable



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profile of firms, and control variables. Additionally, we analyse different regional contexts where the research between CoE and CSR has been examined through the years. The paper closes with the conclusions section, with new ideas for studies in this field in order to open future avenues for research within this specific topic—i.e., suggestions related to innovative studies on CSR and CoE.

## 2. Method

In order to select the sample of articles for our literature review, we searched for the keywords “sustainability”, “CSR”, “corporate social responsibility”, “cost of equity”, and “cost of capital” between 2008 to 2018 in both Google Scholar and Web of Science (WOS) from the Institute for Scientific Information (ISI). The time period was selected to cover the last decade in order to provide a spectrum wide enough to reflect a period when corporate social responsibility has been on the agenda worldwide, and especially in Europe, as it can bring benefits in terms of risk management, innovation capacity, cost savings, customer relationships, access to capital, and human resource management<sup>1</sup>. The search was refined by checking that the contents were really focused on the target relationship under analysis, and that the journal is covered by WOS. The article by Richardson and Welker (2001) was also finally included in the sample because of its impact and its pioneering approach. The final sample comprises 22 articles (see Table 1, which illustrates their impact through the citations in WOS).

Author	Citations
Richardson and Welker (2001)	227
Sharfman and Ferrando (2008)	285
Dhaliwal et al. (2011)	680
El Ghoul et al. (2011)	475
Reverte (2012)	69
Xu et al. (2014)	31
Dhaliwal et al. (2014)	118
Feng et al. (2015)	9
Harjoto and Jo (2015)	48
Ng and Rezaee (2015)	30
Kim et al. (2015)	20
Li and Foo (2015)	11
Gupta (2015)	8
Martínez-Ferrero and García-Sánchez (2017)	10
Sato and Takekura (2017)	3
Li et al. (2017)	6
Eom and Nam (2017)	5
Michaels and Gruning (2017)	8
Weber (2018)	1
Breuer et al. (2018)	4
El Ghoul et al. (2018)	18
Li and Liu (2018)	2

Note: Information obtained from WOS on 25 February 2020.

Table 1 Articles studied and number of citations.

The earliest articles on CoE are based on the capital asset pricing model of Sharpe (1964) and Lintner (1965) and the three-factor model by Fama and French (1993). These early studies were mostly undertaken in the US

<sup>1</sup>See the European Competitiveness Report 2008 (COM(2008)774), as well as the accompanying Working Paper SEC (2008) 2853.

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setting because of the importance of their capital markets and data availability, analysing financial and corporate variables other than sustainability, since companies did not really disclose CSR information in those days. Table 1 shows that the first article clearly referred to CoE and sustainability goes back to the turn of the millennium and focuses only on social disclosures as well as financial information (Richardson and Welker, 2001). Table 1 shows the articles revised in our study.

## 3. Results and Discussion

### 3.1. Theoretical Frameworks

Existing research on CSR and CoE is framed mostly within three theories, as follows.

According to the legitimacy theory, companies face different political and social pressures from various stakeholders. Hence, firms might feel pushed to adopt a “social” behaviour to legitimise themselves (De Villiers and Van Staden, 2006) or disclose CSR information by facilitating media coverage so that society can accept the company’s business practices (Li et al., 2017). These disclosures may be manipulated by companies to maintain a socially responsible image (De Villiers and Marques, 2016). Controversial (e.g., mining, tobacco, gambling, and sexual activities) or sensitive industries often create negative externalities (Hong and Kocperczyk, 2009; El Ghouli et al., 2011), so these firms are expected to disclose more detailed ESG information in order to legitimise themselves and reduce their CoE by compliance with social norms to establish business operations and good relations with stakeholders (De Villiers and Marques, 2016).

Out of the 22 articles under analysis of CSR and CoE, 4 articles (18%) refer to legitimacy theory (Li et al., 2017; Martínez-Ferrero and García-Sánchez, 2017; Michaels and Gruning, 2017; Weber, 2018). In line with promoting a good image among stakeholders, CSR represents an important variable to improve firm’s legitimacy by receiving favourable news coverage (Li et al., 2017) and increasing its credibility with external assurance (Martínez-Ferrero and García-Sánchez, 2017).

Agency theory is based on the “stewardship problem” between principals (shareholders) and agents (management), since the latter may act according to their “economic self-interest”, possibly expropriating the firm’s assets against the shareholders’ interest because of misuse of private information. Furthermore, shareholders must incur costs to monitor agent’s activities and bear risk (Jensen and Meckling, 1976). Voluntary disclosure (such as CSR information, for instance) reduces information asymmetries by reducing transaction costs, increasing the demand of shares, and consequently decreasing CoE (Diamond and Verrecchia, 1991). Moreover, shareholder’s future risk estimations decrease and, finally, non-diversified risk also diminishes (Coles et al., 1995; Clarkson et al., 1996). The agency theory also provides a framework in the sense that management can be encouraged to pursue and disclose CSR activities in order to maximise salary bonus, secure job positions, and avoid future conflicts with stockholders (Healy and Palepu, 2001), reducing information asymmetry and the company’s financial uncertainty (Richardson and Welker, 2001; Verrecchia, 2001). In addition, voluntary external assurance of nonfinancial information (Sierra et al., 2014; Zorio et al., 2014) reduces agency conflict and their CoE (Martínez-Ferrero and García-Sánchez, 2017). In spite of all the literature above, Breuer et al. (2018) cite agency theory in anticipation of a positive relationship between CSR and CoE as they argue that CSR can be a costly diversion of scarce resources.

Out of the 22 articles reviewed for this literature review, 6 articles (27%) refer to agency theory (Gupta, 2015; Feng et al., 2015; Martínez-Ferrero and García-Sánchez, 2017; Suto and Takahara, 2017; El Ghouli et al., 2018; Breuer et al., 2018).

Finally, stakeholder theory posits that companies need to have good relationships with different agents—including employees, customers, suppliers, government institutions, and shareholders—as well as by practising and disclosing socially responsible activities. Regarding CSR nonfinancial disclosures, the firm’s objective is to inform stakeholders about the different socially responsible activities with the purpose of maintaining business operations, reducing financial risk and, consequently, the CoE (Li and Foo, 2015). Social arrangements determine the importance of

# Anexo 1. Corporate Social Responsibility and cost of equity: Literature review and suggestions for future research

different stakeholders. In fact, an empirical study related to CSR disclosures with companies operating in liberal market economies (United States and United Kingdom) and economies where the state leads a more important supervisory role in the economy (Spain, Portugal, France) concluded that firms with headquarters in state-led economies disclose more detailed stakeholder information (labour, environment, community) than firms in liberal market economies (Gallego-Alvarez and Quina-Custodio, 2017). As regards code of law countries, the state or government plays a major role in economic decisions and different social groups (e.g., unions, clients, providers of capital, suppliers) exert pressure to regulate political actions in favour of their interests (La Porta et al., 2008; Liang and Renneboog, 2017).

Finally, as regards our specific literature review on CSR and CoE, 10 out of the 22 articles (45%) are framed within the stakeholder theory (Richardson and Welker, 2001; El Ghouli et al., 2011; Reverte, 2012; Dhaliwal et al., 2014; Harjoto and Jo, 2015; Li and Foo, 2015; Martínez-Ferrero and García-Sánchez, 2017; Michaels and Gruning, 2017; El Ghouli et al., 2018; Breuer et al., 2018).

Some of the analysed articles refer to a multifaceted theoretical approach (as Martínez-Ferrero and García-Sánchez, 2017, who build on the three theories mentioned above). On the other hand, other articles in our specific review on CSR and CoE do not specifically refer to any particular theory. Note for instance Xu et al. (2014), who simply mention stakeholder theory as a keyword but do not refer to it in the text, or Li and Liu (2018), who refer to stakeholders and information asymmetry reduction yet do not properly build the conceptual theories behind this.

Other articles in our review (e.g., Dhaliwal et al., 2011; Reverte, 2012; Martínez-Ferrero and García-Sánchez, 2017; Weber, 2018) also refer to voluntary disclosure theory (Botosan and Plumlee, 2005; Botosan, 2006), as sustainability engagement and CSR reports are used as a means to decrease information asymmetries and increase confidence in how social and environmental risks are managed (Li and Foo, 2015). From our point of view, this theory is very much in line with the postulates of the three theories above, being somehow a summary of the consequences of the other three explained theories.

Finally, Li et al. (2017) also refer to signalling theory, which investigates the implications of signals in information asymmetry.

## 3.2. Research Methodologies

Next, we explain the different methodological approaches of the 22 articles under study.

In most of the studies in our literature review, authors use regression analysis (Richardson and Welker, 2001; Sharfman and Fernando, 2008; Reverte, 2012; Feng et al., 2015; Kim et al., 2015; Li and Foo, 2015; Gupta, 2015; Eom and Nam, 2017; Michaels and Gruning, 2017; Weber, 2018; Li and Liu, 2018). Li et al. (2017) uses both ordinary least squares (OLS) and generalised least squares (GLS), while Weber (2018) uses a matched sample of GRI CSR with a propensity score as well as regression analysis.

Some studies address potential endogeneity and self-selection bias by carrying out two-stage regressions (2SLS) (as in Dhaliwal et al., 2011, 2014; Xu et al., 2014; Harjoto and Jo, 2015; Ng and Rezaee, 2015; Suto and Takehara, 2017; Breuer et al., 2018; Li and Liu, 2018) or the generalised methods of moments (GMM), following the technique developed by Blundell and Bond (1998), as in El Ghouli et al. (2011); Gupta (2015) or by Arellano and Bond (1991) in Martínez-Ferrero and García-Sánchez (2017). El Ghouli et al. (2018) uses both two-stage least squares (2SLSs) estimation and a dynamic system with GMM.

## 3.3. Dependent, Independent, and Control Variables

In the 22 empirical studies of our sample, the dependent variable is the implied CoE, also called cost of capital in some studies. It can be defined as the percentage rate of return to obtain the market value of an asset by discounting future cash flows dividends (El Ghouli et al., 2011); or, in other words, the internal rate of return that investors expect to gain by maintaining their capital investment on the firm (Reverte, 2012; Suto and Takehara, 2017).

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The models used to obtain the different proxies for CoE are shown in Figure 1.

In the majority of the 22 analysed articles, ex-ante models are used to calculate CoE considering forecasted earnings based on an analyst's consensus and current prices. [Reverte \(2012\)](#) argues that the CoE obtained with ex-ante models is a better proxy than ex-post realised stock returns (by definition, a backward-looking measure). CoE is more reliant on cross-sectional variation amongst the companies, and it does not need long-time series to be robust and is not dependant on a specific asset pricing model. [Gupta \(2015\)](#) also supports the use of ex-ante models because they can account for unexpected news on cash flow or a firm's fundamentals, which obviously cannot be not depicted in ex-post measures, and provides many examples of the growing volume of literature using this approach. Hence, the ex-ante models to calculate CoE in the articles in the sample follow mostly [Claus and Thomas \(2001\)](#), [Gebhardt et al. \(2001\)](#), [Easton \(2004\)](#), and [Ohlson and Juettner-Nauroth \(2005\)](#). Note that [Claus and Thomas \(2001\)](#) assume the market price expressed as projected residual and book value earnings for a time horizon of 5 years and constant dividend payouts. [Gebhardt et al. \(2001\)](#) consider stock prices as return over equity projections with a time horizon from 2 to 12 years. The price earnings growth (PEG) model considers a time horizon of 2 years, projected earnings per share for year 2, year 1, current market price, and zero dividend payments ([Easton, 2004](#)). The previous model is recommended for CoE estimations by [Botosan and Plumlee \(2005\)](#) and [Botosan et al. \(2011\)](#), and implemented by [Reverte \(2012\)](#), [Martínez-Ferrero and García-Sánchez \(2017\)](#), and [Michaels and Gruning \(2017\)](#). Out of the 22 studies on CSR and CoE, 19 (86%) implement this type of ex-ante model.

Gordon's constant growth model is generalised by [Ohlson and Juettner-Nauroth \(2005\)](#), which defines the cost of equity using stock market price, one-year projected earnings, and perpetual growth rate. [Ng and Rezaee \(2015\)](#) proxy CoE with a variation of the price multiple—the industry-adjusted earnings-price ratio—as well as with the finite horizon expected return model ([Gordon and Gordon, 1997](#)).

In some studies (e.g., [Dhaliwal et al., 2014](#); [Li and Foo, 2015](#); [Gupta, 2015](#); [Breuer et al., 2018](#)), CoE is calculated as an average of the three proxies developed by [Gebhardt et al. \(2001\)](#), [Claus and Thomas \(2001\)](#), and [Easton \(2004\)](#) and/or their further refinements, or even use the average plus some of the proxies, as in [Xu et al. \(2014\)](#). Some authors deduce risk free government note yields from the average result ([Eom and Nam, 2017](#)).

Ex-post models are also used to examine the relationship of CSR and CoE. For instance, the capital asset price model (CAPM) states that the expected market return is measured by implementing a single-variable stochastic model ([Sharpe, 1964](#); [Lintner, 1965](#)). The model takes into account the risk-free data composed of treasury note debt yields; beta, which encloses the systematic relationship between the market and the firm's individual risk; and, finally, the risk-free premium obtained by the difference between market return and the risk-free rate. The CAPM approach is implemented to obtain CoE and analyse its relationship with environmental risk management disclosures in [Sharfman and Fernando \(2008\)](#).

Finally, other studies apply the three-factor model to obtain (or even explain) CoE. This model proposed by [Fama and French \(1993\)](#) considers additional variables, i.e., beta, the market-to-book ratio, and size (as in [Suto and Takehara, 2017](#), following [Fama and French, 1997](#)). Note that some of the analysed articles used ex-ante models to estimate CoE and the variables in the three factor-model as control variables, as we explain in the next subsection ([Dhaliwal et al., 2011](#); [El Ghouli et al., 2011](#); [Reverte, 2012](#); [Li and Foo, 2015](#); [Feng et al., 2015](#)).

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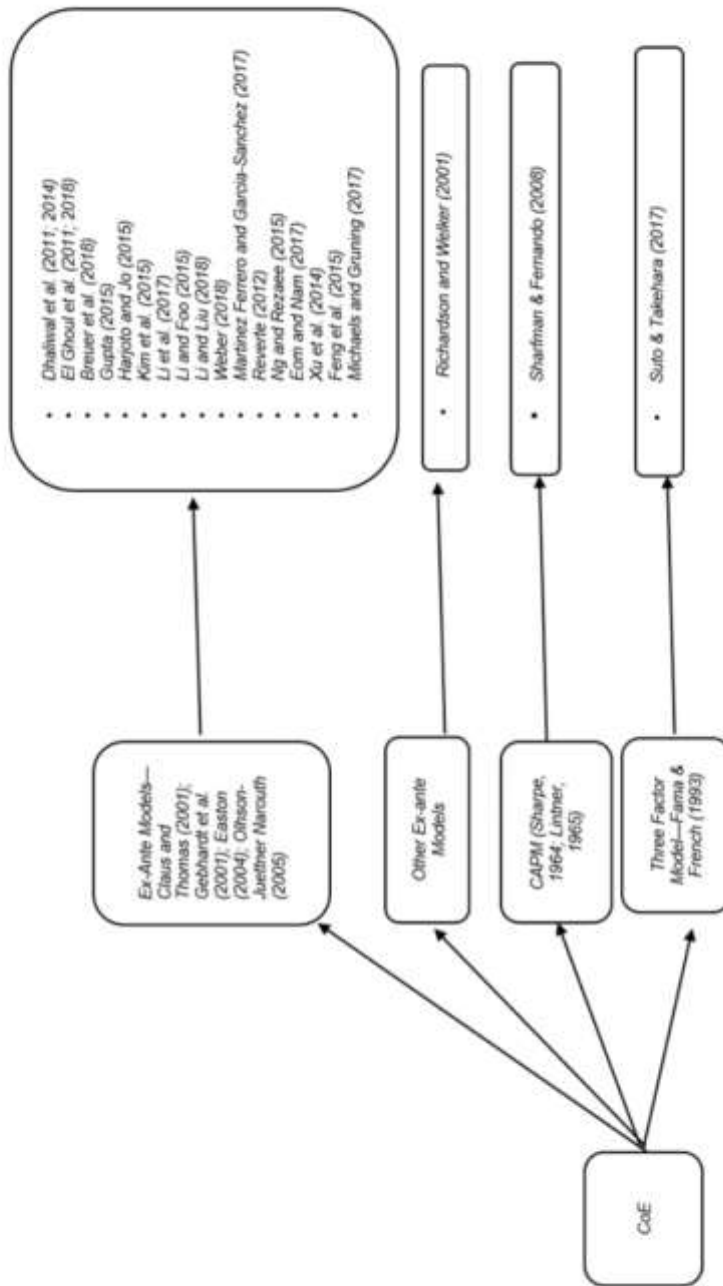


Figure 1 Cost of equity models used in the articles under study.

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Some authors in our sample not only explore the relationship of CSR with CoE, but also with the cost of debt (e.g., [Suto and Takehara, 2017](#)), information asymmetry ([Michaels and Gruning, 2017](#)), corporate value through Tobin's Q ([Eom and Nam, 2017](#)), or the firm risk and its investor base ([Breuer et al., 2018](#)).

The relationship between CoE and sustainability has been examined through many different lenses using a wide range of independent variables to contrast different hypotheses, controlling for different aspects somehow determined by the sample and, of course, including some kind of measure for CSR reporting or for the sustainable behaviour of the company.

Therefore, regarding independent variables, different authors provide several proxies. For instance, [El Ghoul et al. \(2011\)](#) uses a community score (based on volunteer programs, charity donations, relation with indigenous people, and taxes, among others), as well as an employee score and environmental score based on many other items. [Reverte \(2012\)](#) uses a CSR score quintile rank. [Xu et al. \(2014\)](#) use a CSR score, also taking into consideration partial scores as CSR investors (stockholder's participation on firm's decision making), CSR employees (health, salary, wages, social benefits, equal recruitment, etc.), CSR customers (R&D activities, consumer satisfaction, etc.), CSR suppliers (fair trade, protection of suppliers' know-how), CSR community involvement (taxes, no child labour, anti-corruption policy, charities, etc.), and CSR environment (good environmental policies and management of pollutants, waste). [Harjoto and Jo \(2015\)](#) create a CSR index based on the disclosure items required by norms yet not by laws. [Gupta \(2015\)](#) further subdivides its main variable, environmental sustainability index (ESI), into three components, namely emission reduction, product innovation, and resource reduction. [Michaels and Gruning \(2017\)](#) develop a disclosure index based on an artificial intelligence model run on the actual CSR reports. [Ng and Rezaee \(2015\)](#) use an economic sustainability measure with three components—growth opportunities, operational efficiency, and research effort. [El Ghoul et al. \(2011\)](#), [Dhaliwal et al. \(2011\)](#), and [Weber \(2018\)](#) also consider if the company is a strong CSR performer or not. [El Ghoul et al. \(2018\)](#) use the ratio of environmental costs to total assets as a proxy for corporate environmental responsibility.

[Reverte \(2012\)](#) takes CSR into account through the ratings provided by the Observatory on Corporate Social Responsibility reports. [Suto and Takehara \(2017\)](#) use data on corporate social performance from an annual CSR questionnaire survey sent to all listed firms in Japanese capital markets. [Richardson and Welker \(2001\)](#) use social performance measures from Canadian society, that sponsored assessments of the annual reports.

Inclusion in a capital market index to indicate socially responsible investment has also been used as a proxy for sustainability ([Eom and Nam, 2017](#)).

Carbon information disclosure is obtained from CSR reports ([Li et al., 2017](#), to calculate disclosure index) or from the National GHG Emission Information System of the Ministry of the Environment ([Kim et al., 2015](#) to calculate carbon intensity as total GHG emission/sales).

Table 2 shows the CSR dimensions or measures studied by the revised articles, as well as the implemented methodology (e.g., OLS, GLS, and robustness tests).

Different control variables have been used by extant research (Table 3).

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Author(s)	Years Covered	Sample	Countries	Methodology	Independent Variables Studied
Richardson and Welton (2001)	1990-1992	324 firm-year observations	Canada	OLS	Financial and social disclosures
Marathon and Bernabe (2008)	2001	267 firm-year observations	USA	Multiple regression model	Environmental risk management
Dhaliwal et al. (2011)	1993-2001	1190 firm standalone reports	USA	OLS	Firm's operating in litigation industries, firm's early CSR reporting year, community, employee relations, environment, product disclosures
El Ghadi et al. (2013)	1992-2007	12,915 firm-year observations	USA	Multivariable regression model, Blundell & Bond for endogeneity effects	Employee relations, environmental practices, product characteristics, diversity, community relations, human rights
Rovito (2012)	2003-2008	114 firm-year observations	Spain	OLS	CSR quality disclosure information scores, sensitive industries
Xu et al. (2014)	2009-2011	831 listed firms fragmented as 79.6% as state-owned enterprises and 20.3% as non-state-owned enterprises	China	OLS & 2SLS for endogeneity effects	Quality disclosures based on investors, employees, customers, suppliers, community, and environment scores
Dhaliwal et al. (2014)	1995-2007	79,212 firm-year observations	31 countries (Australia, Austria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Germany, Greece, Hong Kong, India, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, UK, USA)	OLS	Financial opacity and environmental, economic, social, and corporate governance disclosures in stakeholder-oriented countries
Feng et al. (2015)	2002-2010	10,803 firm-year observations	25 countries (United States, Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Australia, China, Hong Kong, India, Japan, New Zealand, Singapore, Taiwan)	Multivariable regression model	Environmental, social, corporate governance, and economic disclosures from Europe, US, and Asian firms

Table 2 - *Cont.*

Author(s)	Years Covered	Sample	Countries	Methodology	Independent Variables Studied
Bojars and Jo (2015)	1993-2009	8259 firm-year observations	USA	Multivariable regression model and 2SLS model	Legal and normative CSR disclosures
Ng and Beech (2015)	1990-2013	3000 firms	USA	OLS and 2SLS (bad lag model for endogeneity) based on Ferreira and Laux (2007) sustainable business practices results and consisting of a bad lag regression design	Economic and economic dimension factors (growth, operation, research) and ESG performance
Kim et al. (2014)	2007-2011	379 firm-year observations	South Korea	OLS and sensitivity analysis	Carbon intensity risk factor
Li and Fwu (2015)	2008-2012	1335 listed firms	China	Fixed cross-sectional time series regression model	Social responsibility quality disclosure from private and non-privately owned firms
Gupta (2015)	2002-2012	23,301 firm-year observations	43 countries (Australia, Belgium, Bermuda, Brazil, Canada, Cayman Islands, Chile, China, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Israel, Italy, Japan, Jordan, Kuwait, Malaysia, Mexico, Netherlands, New Zealand, Norway, Peru, Philippines, Poland, Russia, Singapore, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK, USA)	OLS, Fama and McBeth two-step regression model, GMM by Arellano & Bover and Blundell & Bond for endogeneity	Environmental sustainability index (ESI) scores (emission reduction, product innovation, resource reduction)
Martinez-Fernandez and Garcia-Sanchez (2017)	2007-2014	8214 firm-year observations	17 countries (Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, India, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, UK, USA)	OLS and GMM based on Arellano & Bond	Assurance of sustainability reports by accounting & engineering firms. Pertaining audit firms, Big 4 is implemented when firms assured reports by accounting firms.
Sato and Takahara (2017)	2007-2013	3558 firm-year observations	Japan	OLS and 2SLS for endogeneity effects lagging one-year CSP variable	Corporate social performance based on five criteria (employment, environmental, social contributions, institutional ownership, and internal governance)

Table 3 - *Cont.*

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Author(s)	Years Covered	Sample	Countries	Methodology	Independent Variables Studied
Li et al. (2017)	2009-2014	101 individual firms	China	OLS	Media reporting, carbon information disclosure, carbon information nonfinancial disclosure, carbon information financial disclosure
Eun and Nam (2017)	2009-2013	86 companies	South Korea	OLS	Corporate value, socially responsible public trading in the KRX index, which represents a benchmark for CSR activities
Michels and Gruning (2017)	2013-2014	264 companies	Germany	Multivariate regression model	CSR scores based on artificial intelligence, CSR disclosure reports, sensitive industries
Weber (2018)	2005-2013	200 individual firms	USA	OLS	Assurance of CSR report disclosed on a voluntary basis based on GRI levels
Breuer et al. (2019)	2002-2015	19,183 firm-year observations	30 countries (Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Finland, France, Greece, Germany, Hong Kong, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Philippines, Portugal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK, USA)	Baseline regression model with fixed panel data variables	CSR engagement based on environmental, social, and investor protection disclosure

**Table 2** Corporate social responsibility and the cost of capital—equity literature: years, sample, regions, methodology, and variables studied.



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	Authors																						
	Richardson and Welton (2001)	Theodorakis and Perrotakis (2009)	Dhaliwal et al. (2011)	El Ghoul et al. (2011)	Reverte et al. (2012)	So et al. (2014)	Dhaliwal et al. (2014)	Peng et al. (2015)	Hargren et al. (2015)	Tsai et al. (2016)	Wen et al. (2016)	Li and Poo (2016)	Cheng (2016)	Martinez-Soto and Garcia-Sanchez (2017)	Yuan et al. (2017)	Li et al. (2017)	Yuan et al. (2017)	Michalski and Grayling (2017)	Walker (2018)	Reverte et al. (2018)	El Ghoul et al. (2018)	Li and Liu (2018)	
Net Short Capitalization		✓	✓		✓				✓		✓												✓
Size - Total Assets				✓		✓		✓				✓								✓		✓	
Industry												✓								✓			
Variable												✓								✓			
Debt		✓		✓					✓		✓												✓
Variable												✓											✓
Leverage		✓	✓	✓		✓			✓		✓								✓	✓	✓	✓	✓
Net Working Capital																							✓
Return on Equity	✓																						
Return on Assets											✓	✓										✓	
ROE									✓													✓	
Advertising									✓														
Intangible																							
Export																							
Variable							✓																
Subsidiary									✓														✓
Debt																							
Equity																							
Foreign																							
Operations									✓														
Foreign																							
Operations									✓		✓												
Size																							
Capital																							
Expatriation									✓														
Variable												✓											
Country in																							
Index																							
Operating Income																							
Current Ratio																							
Account																							
Profitability of R&D											✓												
Return																							
Dependent																							
Foreign																							
Ownership																							✓

Table 3 - Cont.

	Authors																						
	Richardson and Welton (2001)	Theodorakis and Perrotakis (2009)	Dhaliwal et al. (2011)	El Ghoul et al. (2011)	Reverte et al. (2012)	So et al. (2014)	Dhaliwal et al. (2014)	Peng et al. (2015)	Hargren et al. (2015)	Tsai et al. (2016)	Wen et al. (2016)	Li and Poo (2016)	Cheng (2016)	Martinez-Soto and Garcia-Sanchez (2017)	Yuan et al. (2017)	Li et al. (2017)	Yuan et al. (2017)	Michalski and Grayling (2017)	Walker (2018)	Reverte et al. (2018)	El Ghoul et al. (2018)	Li and Liu (2018)	
Size			✓		✓	✓		✓															
Industry	✓																						✓
Debt			✓	✓		✓														✓	✓	✓	
Variable																							
Advertising																							
Intangible						✓																	
Export																							
Variable																							
Subsidiary																							
Debt																							
Equity																							
Foreign																							
Operations																							
Foreign																							
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Size																							
Capital																							
Expatriation																							
Variable																							
Country in																							
Index																							
Operating Income																							
Current Ratio																							
Account																							
Profitability of R&D																							
Return																							
Dependent																							
Foreign																							
Ownership																							

Table 3 - Independent control variables based on the reviewed literature.

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### *3.4. Sample Characteristics, Regional Settings, and Main Research Findings*

In this section, we analyse the samples used by prior research, paying special attention to their size, covered period, and regional setting. Given the nature of the dependent variable (CoE), this type of study is obviously restricted to listed companies. Studies vary from having a very small sample size (114 observations in Reverte, 2012, in just one country, Spain) to having large samples in a multi-country setting (74,077 observations from 31 countries as in Dhaliwal et al., 2014, for instance).

The first study covered just three years (Richardson and Welker, 2001), whereas the latest data in the samples used correspond to 2002–2015 in Breuer et al. (2018). The more recent studies show many robustness checks, bearing in mind many different categories for some variables (for instance, the years in order to control for the effect of the economic crisis as in El Ghoul et al., 2018).

All of the studies confirm the negative relationship expected between CSR and CoE, except for Richardson and Welker (2001), and, in addition, Suto and Takehara (2017) and Eom and Nam (2017) do not find significant results.

The first study on CoE and sustainability covered 124 firms from Canada, with data from 1990–1992 (Richardson and Welker, 2001). Evidence was found of a significant positive relation between social disclosures and the cost of equity capita, even though companies had better financial performance.

However, most of the existing research demonstrates a negative relationship between CSR and CoE. In addition, the majority of studies are based on US samples because of the availability analyst forecast data. Sharfman and Fernando (2008) use a sample with 267 US firms, concluding that benefits from improved environmental risk management lead to a reduction in CoE. Dhaliwal et al. (2011) analyse 1190 CSR reports from 294 US firms, finding that companies with a high CoE in the previous year tend to initiate CSR disclosure in the current year, and that initiating firms with high CSR performance enjoy a subsequent reduction in CoE, attracting institutional investors and analyst coverage. El Ghoul et al. (2011) with a sample of 12,915 firm observations conclude that firms with better CSR scores have lower CoE, whereas belonging to “sin” industries (namely, nuclear power, and tobacco) increases CoE. Harjoto and Jo (2015) analyse 2034 US firms, demonstrating that, amongst other consequences, CSR intensity (more specifically, legal CSR) reduces CoE. Finally, Weber (2018) uses 878 CSR reports prepared under the G3 or G3.1 Guidelines from 2005 to 2013, finding that GRI disclosure level has not had an impact on CoE per se, yet a negative association for poor CSR performers reporting at high GRI level and CoE is observed, if the report is assured.

In Asia, and more particularly in China, Korea, and Japan, studies on this relationship have also been undertaken.

In China, Xu et al. (2014), using a sample of listed firms in Shanghai Stock Exchange, show that firms with higher CSR scores have significantly lower CoE, an effect which is more pronounced in times of economic recession. In addition, even though state-owned companies have better CSR and lower CoE than the others, the effect of CSR in reducing CoE is weaker in state-owned companies. Li and Foo (2015) use 1015 CSR report quality scores, finding evidence that CSR report quality is strongly and negatively related with CoE, with a much higher impact in lowering CoE for privately owned corporations, even though the distinction between mandatory versus voluntary CSR disclosures does not have a significant impact on CoE. Li et al. (2017) focus on 161 listed companies operating in heavily polluting industries, showing that media reporting improves carbon information disclosure (both financial and nonfinancial disclosures), which is negatively associated with CoE. Finally, also in China, Li and Liu (2018) analyse 1708 observations from 2008 to 2014, finding that the quality of the CSR disclosure is negatively related to CoE, especially amongst environmentally sensitive industries, state-owned enterprises, and those that are larger in size.

In the Korean setting, the sample of Kim et al. (2015) includes 379 firms from the period 2007 to 2011, concluding that carbon intensity is positively related to CoE, no matter whether the companies voluntarily published sustainability reports or not, with this effect being lower for firms belonging to industrial sectors with large carbon emissions. Eom and Nam (2017) use 86 companies listed in Korea, from 2009 to 2013. Their results cannot provide evidence of any significant relation between the incorporation of the SRI index and CoE or corporate value. Moreover,

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depending on the phase of introduction of the SRI index, the results revealed a negative or positive correlation with CoE, probably because of mixed optimistic and pessimistic expectations from investors about CSR activities, or because this index may not correctly reflect CSR performance.

**Suto and Takehara (2017)**, using 3461 observations of Japanese firms, did not provide evidence of a significant relationship between corporate social performance and CoE, yet institutional ownership has a strongly negative influence on CoE.

In Spain, **Reverte (2012)**, using only 114 firm-year observations from 26 firms covering from 2003 to 2008, finds a significant negative relationship between CSR disclosure ratings and CoE, which is even more pronounced for those firms operating in sensitive industries.

In Germany, **Michaels and Gruning (2017)** analyse the relation between CoE and CSR disclosures of 264 sensitive firms in 2013/2014. The disclosure variable was obtained through combining a series of coding schemes to score CSR disclosures. Results demonstrate that CSR-sensitive firms have greater equity costs but implementing voluntary disclosure decreases CoE.

In an international setting, several studies find evidence of the negative relationship between CSR and CoE. Using data from different countries obviously allows authors to explore the impact on national characteristics, such as stakeholder protection and governance or cultural variables.

**Dhaliwal et al. (2014)** using a sample with 5135 standalone CSR reports from 1093 companies find a negative link between CSR disclosures and CoE which is more pronounced in stakeholder-oriented countries. They also provide evidence that financial and ESG disclosures behave like substitutes in reducing CoE. The sample of **Feng et al. (2015)** includes 10,803 firm-year observations from 25 countries. They find evidence that, in general, firms with better CSR scores have a significantly reduced CoE in North America and Europe, yet these results do not hold in Asian countries (which is somehow contrary to the evidence obtained for China or Korea by **Li and Foo (2015)**, **Li et al. (2017)**, **Li and Liu (2018)**, and **Kim et al. (2015)**) as explained above.

**Ng and Rezaee (2015)** use a sample with over 3000 firms (countries not explicit), from 1990 to 2013, finding a negative association between CoE and growth and research (environmental and governance) sustainability performance, with social performance being only marginally related to CoE. In general, the relationship is strengthened when ESG performance is strong.

**Gupta (2015)** uses 23,301 firm-year observations from 2002 to 2012. The obtained findings suggest that better environmental practices (mostly reduction of emissions and waste) lead to lower CoE, with this effect being more pronounced in countries where country-level governance is weak.

**Martinez-Ferrero and García-Sánchez (2017)** use a sample of 1410 companies from 17 countries between 2007 and 2014, and find evidence of lower CoE for companies that publish and assure their social and environmental reports, especially if the assurance is provided by a Big 4 firm. **Breuer et al. (2018)**, with a sample of 19,183 firm-year observations from between 2002 and 2015, find that if investor protection is high (low), CoE decreases (increases) if the company invests in sustainability. **El Ghoul et al. (2018)** analysed manufacturing firms in 30 countries from 2002 to 2011 and find that CoE is lower if companies have higher environmental responsibility.

In most of the studies in an international setting, we noted that the samples tend to be dominated by Anglo-Saxon countries because of data availability (for example, see **Breuer et al., 2018** and **El Ghoul et al., 2018**).

## 4. Conclusions

This study presents a thorough literature review on the effects of CSR on CoE. We analysed the different theoretical frameworks, methodological approaches, variables under study, regional settings, and most important conclusions that can be drawn from all the analysed articles.

The study's most important contribution to the literature is the updated and detailed revision of 22 papers studying the link between CSR and CoE. Note that the latest review of this kind (**Benlemlih, 2017**) has included only 6 papers and only up to 2014. We provide a precise understanding of what has been already investigated and

## Anexo 1. Corporate Social Responsibility and cost of equity: Literature review and suggestions for future research

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the findings of prior researchers regarding the reduction in CoE due to sustainable behaviour. In addition, our review identifies certain gaps in the extant literature, detects inconsistent findings—e.g., [Richardson and Welker \(2001\)](#) find a positive link between CoE and CSR, contrary to expectations and [Suto and Takehara \(2017\)](#) and [Eom and Nam \(2017\)](#), which have inconclusive evidence. We also provide examples of possible data sources and control variables and provide directions for exploring new avenues of research in future studies.

This literature review shows that there are different methodologies to calculate CoE and that there are many possibilities to proxy for the sustainable behaviour of the companies, as well as many interesting control variables depending on the research setting. This paper is unique and valuable because of the high number of covered articles and its timeliness (with articles published up to 2018). Future researchers working in this field will hopefully find this review most useful when defining their own research variables in the design of their own empirical study and discussion of their own findings by providing comparisons with prior studies.

Our findings reveal that certain areas of the world have been overlooked by researchers in this field (for instance, the developing economies in Latin America or Africa). Therefore, future avenues of research might make valuable contributions to literature if they focus on these regions where sustainability should also be a priority, since the extractive industry is so important there and pollution needs to be mitigated to combat climate change. Along these lines, we think that it is most relevant that future researchers pay attention to carbon reporting and its effects on CoE (as [Kim et al. \(2015\)](#) and [Li et al. \(2017\)](#)) because of the United Nations Sustainable Development Goal (SDG) of climate action. In addition, the trend to submit the CSR reports to external assurance in order to increase the credibility should also be contrasted so as to demonstrate that it can also reduce CoE (as initially explored by [Martínez-Ferrero and García-Sánchez \(2017\)](#) and [Weber \(2018\)](#)). In addition, alternative methodologies can be used by researchers as shown in some of the analysed papers.

As limitations of our research, we acknowledge that focusing on the specific relationship between CoE and CSR implies that our study excluded many other papers that studied the links of CSR and other variables with CFP. On the other hand, keeping the sample focused on CSR and CoE allows for further extraction of details regarding the links between CSR and CFP than in the case of a much larger sample.

This type of research has practical implications for managers. The obtained evidence can motivate them to invest in sustainability initiatives in order to benefit from a lower cost of capital. The opposite may also hold, in the sense that if stockholders are concerned about social as well as environmental issues such as the depletion of natural resources, pollution, and global warming, the environmentally irresponsible companies will be penalised through a higher cost of capital.

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**ANEXO 2. SUSTAINABILITY ENGAGEMENT IN LATIN AMERICA  
FIRMS AND COST OF EQUITY**



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# Sustainability engagement in Latin America firms and cost of equity

Sustainability  
and CoE in  
Latin America

## El Compromiso Sostenible de Empresas Latinoamericanas y su relación con el Costo de Capital

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### Abstract

**Purpose** – Corporate social responsibility (CSR) actions are expected to reduce information asymmetries and increase legitimacy among the stakeholders of the company, which consequently should have a positive impact on the financial conditions of the firm. Hence, the objective of this paper is to find empirical evidence on the negative relationship between sustainable behavior and the cost of equity, in the specific context of Latin America. To address this issue, some proxies and moderating variables for sustainability are used in our study.

**Design/methodology/approach** – The regression model considers a sample with 252 publicly trading firms and 2,772 firm-year observations, from 2008 to 2018. The generalized method of moments is used to avoid endogeneity problems.

**Findings** – The study finds evidence that firms with higher environmental, social and governance activities disclosed by sustainability reports and assured by external providers decrease their cost of equity, especially if they are in an integrated market as MILA. This finding confirms that agency conflicts between firm's management and stakeholders diminish with higher CSR transparency, leading to a lower cost of capital.

**Originality/value** – Our research is unique and valuable as, to our knowledge, it is the first study to analyze the impact of sustainable behavior and the cost of equity from companies operating in Latin America.

**Keywords** Corporate social responsibility, CSR, ESG, Cost of equity, Stakeholder theory

**Paper type** Research paper

### Resumen

**Propósito** – Las actividades de Responsabilidad Social Empresarial permiten disminuir asimetrías de información e incrementar la legitimidad ante los *stakeholders* de una empresa, generando impactos positivos financieros para la misma. De hecho, el objetivo del artículo es medir la relación entre el comportamiento sostenible y el Costo de Capital en el contexto empresarial latinoamericano. Para ello, consideramos algunas variables proxy y moderadoras sustentables en nuestro estudio.

**Diseño/Metodología/Enfoque** – El modelo considera una muestra de 252 empresas cotizadas y 2772 observaciones que abarcan el período de 2008 a 2018. Se implementa el Modelo Generalizado de Momentos para evitar problemas de endogeneidad.

**Resultados** – Los autores evidencian que empresas con altos niveles de divulgación ambiental, social y gobernanza corporativa a través de reportes de sostenibilidad y asegurados por proveedores externos disminuyen el Costo de Capital, especialmente si cotizan en un mercado integrado como el MILA. Estos hallazgos confirman que se reduce la asimetría de información entre la gerencia y los *stakeholders*, dado que incrementa la transparencia mediante la Responsabilidad Social Corporativa y ello conduce a un menor Costo de Capital.



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**Originalidad/Valor** – Nuestro estudio es único dado que, hasta la fecha, es el primer estudio que analiza el impacto de la divulgación voluntaria de RSE y Costo de Capital de empresas que operan en Latinoamérica.

**Palabras clave** Responsabilidad social empresarial, CSR, Costo de capital, Teoría de los stakeholders

**Tipo de papel** Trabajo de investigación

### 1. Introduction

In recent years, corporate social responsibility (CSR) has become a major trend in the whole world, especially amongst multinational corporations operating in emerging markets. The growth of CSR reporting has increased from 35% to 93% between 1993 and 2017 (KPMG, 2017). The CSR reporting rate in Latin America has reached 81%, mainly because firms' core business is extracting and exporting natural non-renewable resources, and hence there is a need to reinforce stakeholders' trust. One main reason for multinationals to work in emerging countries is less expensive labor and other operating expenses. In fact, Latin America has been a recipient of 151 billion US dollars on foreign direct investment allocated in telecommunications, mining, paper pulp and chemical-related industrial sectors (United Nations Conference on Trade and Development, 2018).

Regarding sustainability engagement, CSR is defined as the relation with different stakeholders by integrating environmental and social elements inside the firms' business operations (Marrewijk, 2013). CSR involves a company's deliberate actions to boost the well-being of all members affected by its business operations and achieve a balance between economic and social goals (Dahiya and Singh, 2020). Sustainability engagement can be understood as the process by which companies integrate environmental and social activities into their business operations and their interactions with different stakeholders on a voluntary basis (European Commission, 2011). CSR is also commonly referred to as the "triple bottom line" (Elkington, 1998), as traditional reporting expands to take into account social and environmental performance in addition to financial performance (as well as corporate governance – i.e. ESG for "Environmental, Social and Governance" reporting). Indeed, Aras and Crowther (2009) refer to four aspects to measure sustainability within an organization: environmental impact, societal influence, finance and organizational culture. CSR reporting and sustainability engagement may not be exactly the same (Bansal and Song, 2017), as the former (CSR reporting) is focused on transparency (mainly captured by a stand-alone report) whereas the latter (sustainable behavior) may be understood as more focused on carrying out specific activities on sustainability (mostly addressed by ESG scores). However, sustainability engagement may consider both, so in our study, both perspectives are taken into account as they are very much related to each other.

In fact, profit-seeking companies all over the world have engaged in social and environmental activities. Specifically, in Latin America, most firms have evolved from extracting and exporting renewable and non-renewable commodities into business units that integrate technology into their production processes and have opted for new capital sources by issuing common shares on domestic and international equity markets. In this sense, these companies are also affected by a trend for social responsible investments (SRI), which involve a philosophical view of firms investing and accomplishing social and environmental non-financial objectives rather than maximizing profits (Reverte, 2012) so that capital sources are provided to environmentally and socially engaged firms (Gupta, 2018). Sustainability research has mostly focused on developed economies (Cordova *et al.*, 2020), but different contributions from the Latin American setting provide evidence for this specific economic context. For instance, Da Rosa *et al.* (2015) find a positive relation between environmental disclosures and the existence of stand-alone and audited reports considering a sample of 50 Brazilian firms from the IBRX-50. Moreover, Husted and Sousa (2019) study the relation between ESG and board of directors structure and conclude that ESG remains positive when

firms have a larger number of board members who are independent. Finally, Freitas *et al.* (2020) study the relation between green human resources management defined as good recruiting, training and rewarding employees, and CSR disclosures considering ISO certifications from a sample of 79 polluting Brazilian firms. Also, recent studies analyze the driving factors for carbon reporting in the Latin American region (e.g. Cordova *et al.*, 2018). Even though these contributions are relevant according to the sustainability context, the relationship between ESG disclosures or CSR reporting by Latin American listed firms and cost of equity (CoE) has not been studied by scholars yet.

CoE is defined as the rate of return that investors expect to gain in the long run by sacrificing liquidity in the short run. In other words, CoE is the percentage return demanded by shareholders for keeping their investments in the firm (Reverte, 2012) or for holding those investments as compared to risk-free rates (Michaels and Gruning, 2017). Existing research has explored the relationship between CoE and different measures related to firms' sustainability, and, surprisingly, evidence has been found on the positive links between both variables (in the early study by Richardson and Welker, 2001 with Canadian firms) or it has arrived to non-conclusive results (Eom and Nam, 2017; Suto and Takehara, 2017). However, according to Garzon-Jimenez and Zorio-Grima (2020), most academic studies prove a negative link in Anglo-Saxon countries (Sharfman and Fernando, 2008; El Ghouli *et al.*, 2011; Dhaliwal *et al.*, 2011; Weber, 2018), Asian countries (Xu *et al.*, 2015; Li and Foo, 2015; Li and Liu, 2018) and multi-country studies with samples including developed and developing countries (Martinez-Ferrero and Garcia-Sanchez, 2017; El Ghouli *et al.*, 2018; Gupta, 2018).

International diversification may be achieved when returns from different capital markets are not correlated and market liberalization policies have been adopted (Panda and Nanda, 2018). The integration of equity markets allows investors to diversify their portfolios by investing capital resources in different markets. In this sense, the Latin America Integrated Market (MILA) consists of a virtual equity market, integrated by Santiago, Bogota and Lima's stock exchanges in 2011. The benefits of virtual integration include free trade of common shares in its local currency and asset diversification for domestic and international investors, with each market keeping its legal autonomy (Mellado and Escobari, 2015; Espinosa-Mendez *et al.*, 2017). The Mexican stock exchange joined MILA in 2014, increasing market capitalization and making MILA the largest market in the region (Escobari *et al.*, 2017). Indeed, different studies analyze MILA's integration, finding that it has increased the correlation of stock returns (Espinosa-Mendez *et al.*, 2017) and that financial crises further affect that dynamic correlation (Mellado and Escobari, 2015). Capital market integration provides long-term economic benefits reducing equity cost, increase investor's base, adapt corporate governance practices and decrease stock-market volatility (Singh, 2009). Equity market integration occurs when financial liberalization and financial market development are correlated. This integration decreases portfolio barriers (Carrieri *et al.*, 2007) and helps capital providers to diversify investment opportunities (Chien *et al.*, 2015). Regarding the emerging market setting, Akbari *et al.* (2020) conclude that an increment on free trade and economic growth promotes integration in developing markets similarly to their developed counterparts, but the integration gap between both types of markets remains. The importance of studying sustainability performance and its inverse relation with equity cost considering MILA may promote further market integration and investment opportunities from foreign SRI funds which focus on environmental and ethical financial prospects. As far as we know, this is the first study that takes into account whether the integration of equity markets can increase the effects of sustainable behavior on the reduction of CoE.

In the Latin American context, non-financial disclosures by firms have been scarcely analyzed. For instance, empirical evidence demonstrates that firm's market-to-book ratio, BETA, size, industrial sector and regulatory state institutions have a positive effect on CSR reporting, this relation being more pronounced in sensitive-industrial firms (Duran and

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Rodrigo, 2018). Also, recent evidence indicates that new requirements on non-financial disclosures have lowered the demand for third-party assurance with no significant effect on sustainable reporting scores of the Peruvian listed firms (Adaui, 2020). The study of sustainability reports disclosed by MILA's business groups and its relation with different corporate governance variables show that foreign ownership, board size, independence, age and firm's internationalization efforts are positively correlated with sustainability disclosures (Correa-Garcia *et al.*, 2020). Nonetheless, to our knowledge, there is no evidence yet on the link between CoE and sustainability reporting specifically in Latin America, a region where there is an increasing trend to publish and assure CSR reports (Zorio-Grima *et al.*, 2015), where we can also take into account the fact that some of their capital markets are integrated in MILA. Note that even though Sethi *et al.* (2017) also report a high percentage of assured CSR reports in their sample, little is known of the subsequent specific effects on CoE in the region.

Therefore, the main objective of this article is to analyze the relationship between CoE measured by the *price earnings growth model* (Easton, 2004) and some sustainable profile indicators: firstly, the ESG index score that measures a company's sustainable behavior; secondly, the disclosure of a CSR stand-alone report, as well as the moderating effects on ESG and CoE of being listed in the MILA or having the CSR report assured (Garcia-Sanchez *et al.*, 2019).

The sample of the study includes 252 publicly traded Latin American firms with 2,772 observations covering the period from 2008 to 2018. A model is run using the data panel estimator proposed by Arellano and Bond (1991), which is based on the GMM to address endogeneity concerns. Our conclusions highlight the inverse relationship evidenced between environmental, social and governance disclosures from Latin American publicly traded firms and CoE. Also, very importantly, we find that ESG disclosures through the assurance of stand-alone reports decrease information asymmetries between capital providers and stakeholders. We also find evidence on the significance of the ESG driver on CoE reduction if the company is listed in an integrated market (such as MILA).

The article is organized as follows. After this brief introduction, section 2 presents the theoretical framework and hypotheses development, section 3 describes the research methodology, section 4 discusses the main results and, finally, section 5 closes with the conclusions of the study.

### 2. Theoretical framework and hypotheses development

Under the framework of several theories, existing research posits that sustainable companies benefit from a lower CoE. According to the agency theory (Jensen and Meckling, 1976), disclosure of financial and non-financial information diminishes information asymmetries, thus eliminating the "stewardship problem" between management and capital providers (Healy and Palepu, 2001). Indeed, the CSR stand-alone report informs on different aspects such as environmental expenditures, climate change activities and charity donations and helps investors to estimate corporate value (Dhaliwal *et al.*, 2014), increasing stock liquidity (Verrecchia, 2001). Additionally, it provides information for improving the stakeholders' decision-making process (Du *et al.*, 2010), increases market returns (Malik, 2015) and hence decreases information asymmetry (Cho *et al.*, 2013; Cui *et al.*, 2018). Non-financial reports help firms to quantify environmental and social expenditures demanded by external stakeholders, thus making firms more accountable and sustainable (Aras and Crowther, 2009). Nevertheless, CSR reporting may be time-consuming and costly and the firm's management might be unsure if reports achieve the purpose of disseminating such information (O'Dwyer, 2002). Evidence on CSR disclosures show that environmental disclosures (specifically waste management and gas emission reduction implemented in

weak government-oriented countries) reward firms with lower equity costs and access to external capital sources from SRI initiatives (Gupta, 2018). On the other hand, Feng *et al.* (2015) find that CSR disclosures decrease the firm's CoE in North America and Europe yet with no effect in Asia, because they argue that higher CSR expenses are seen as advertising costs leading to a negative reaction from market participants when a company raises equity capital in the Asian markets. Also in Asia, Suto and Takehara (2017) confirm this finding, as they cannot evidence a significant relation between CoE and corporate social performance from Japanese listed firms even though institutional ownership is evidenced to have a negative impact on capital costs. Lastly, in Asia, Dahiya and Singh (2020) confirm the correlation between CoE and ESG proxies considering Indian manufacturing firms. Breuer *et al.* (2018) look into the relationship between CSR engagement, CoE and different levels of investor protection in a multi-country study, finding that if investor protection is high, firms with greater CSR investments decrease their CoE since CSR disclosures protect stockholders from insiders' expropriation of firm's assets. Similarly, corporate environmental and social practices disclosed by UK listed firms have a negative impact on risk and CoE, increasing the firm's market value by reducing the asymmetries between capital providers and management (Ahmed *et al.*, 2019).

The stakeholder theory establishes that the firm's goal is to maximize shareholder's earnings yet protecting stakeholder's interests (Freeman, 1984; Jensen, 2002). Hence, firms should not only maximize earnings to stockholders but distribute returns to all interested parties by optimizing firm's performance in the long-term as management should act on behalf of both – stakeholders and capital providers (Aras and Crowther, 2007). There are in fact a growing number of socially responsible investors who invest in shares from sustainable firms (Kapstein, 2001). Therefore, companies disclosing information on socially oriented activities reduce firm's intrinsic risk, and finally CoE (Li and Foo, 2015). In this sense, the relation between CoE and CSR is inverse according to most studies in the field. Nevertheless, the early study by Richardson and Welker (2001) shows a positive correlation between CoE and social disclosures in Canada, arguing that the reason may be that social projects can increase firms' risk. Contrary to that argument, subsequent contributions, as per El Ghouli *et al.* (2011), conclude that voluntary CSR disclosures (e.g. on employee relations, environmental practices, product characteristics and social scores) decrease CoE and raise the investors base in the USA. Harjoto and Jo (2015) differentiate between legal CSR (required by legal authorities) and voluntary CSR and demonstrate that CSR intensity (on legal CSR disclosures) decreases analysts' lack of consensus, reducing not only price volatility but also CoE. In Europe, Reverte (2012) analyzes the relation between CSR quality disclosure scores and CoE from Spanish listed firms and concludes that firms with greater CSR quality disclosures decrease their CoE, especially in sensitive industries. Similarly, Michaels and Gruning (2017) indicate that German firms publishing CSR reports take benefit from additional capital sources and lower their CoE. Regarding Asia, Li and Liu (2018) demonstrate that greater CSR quality disclosures from sensitive industry firms listed in China diminish CoE. Chen *et al.* (2020) study the relation between CoE and a CSR disclosure index from Taiwanese firms, taking into consideration if the company is in an introductory or maturity period. Results show that in both cases, strong CSR performers outperform poor CSR performers, thus benefiting from good analyst ratings, profitable results and management's internalization of CSR practices. Finally, in a multi-country study, El Ghouli *et al.* (2018) prove that disclosing and enhancing corporate environmental responsibility decreases CoE. The latter study expands Sharfman and Fernando's (2008) research considering the inverse relation between environmental risk management disclosures and ex-post returns obtained through the capital asset pricing model by Sharpe (1964) and Lintner (1965) from US-listed firms. Regarding the assurance of non-financial reports, Martinez-Ferrero and Garcia-Sanchez (2017) evidence a negative impact of CSR reports on CoE, which

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is more powerful if the report has been externally assured, especially by a Big Four accounting firm. Assurance is therefore revealed as an effective mechanism for stakeholders to monitor management activities in the implementation of sustainable action as well as a means for increasing information reliability (Sierra-Garcia *et al.*, 2014).

Finally, the legitimacy theory posits that companies face social and political pressure from different stakeholders and consequently find a way to legitimize their business practices by adopting socially oriented behaviors (De Villiers and Van Standen, 2006). Therefore, firms engage in ESG activities to maintain legitimacy by accomplishing a social bond (Guthrie and Parker, 1989). Furthermore, ESG and CSR reporting can be seen as a trade-off because firms sacrifice short-term profits to improve long-term earnings by promoting “goodwill” and good reputation among clients and society participants (Ng and Rezaee, 2015). Moreover, optimal ESG investments enhance the firm’s positive externalities and reduce negative externalities by balancing expense efforts and benefits (Brockett and Rezaee, 2012). The legitimacy theory provides also a good framework to explain why sensitive companies known as “sin firms” (Hong and Kacperczyk, 2009) disclose additional CSR information to improve firms’ image and reputation (Weber, 2018) and consequently reduce their CoE (Michaels and Gruning, 2017). Regarding sin industries, Hmaitane *et al.* (2019) conclude that CSR disclosures have a negative impact on CoE which is more pronounced in alcohol and tobacco sectors. This evidence helps to encourage management to actively engage in CSR activities.

### *2.1 Environment social and governance score*

Research on CoE and CSR uses many proxies for sustainability, for example, CSR rankings, sustainability ratings and quality scores (Li and Foo, 2015) or the Global Reporting Initiative disclosure levels (Weber, 2018). For instance, in Asia, Kim *et al.* (2015) analyze carbon emissions from South Korean firms and conclude that higher carbon intensity scores increase CoE, no matter whether companies disclose such reports voluntarily or not. In China, Li *et al.* (2017) consider a sample of heavy polluting firms to demonstrate that media reporting improves quality of financial and non-financial carbon disclosures, and hence a reduction in CoE.

In our study, we use the ESG indicator provided by Thomson Reuters Eikon database, which takes into account environmental, social and governance information gathered from different sources such as CSR reports, annual financial disclosures and electronic sources. This proxy is commonly used as good proxy for the level of sustainable behavior or activities of the company, which helps to improve the legitimacy of the company, its links with stakeholders and monitor somehow the management of the firm, as stated by the three different theoretical frameworks explained above. Many other studies in the field also use ESG scores from databases (as Sharfman and Fernando, 2008; El Ghouli *et al.*, 2011; Dhaliwal *et al.*, 2011; Ng and Rezaee, 2015). For instance, Ng and Rezaee (2015) investigate the effects on CoE of an ESG comprising three components: growth opportunities, research effort and operational efficiency. Gupta (2018) demonstrates that implementing good environmental practices on weak country-level governments helps firms to access capital from SRI funds. Feng *et al.* (2015) analyze the relationship between CoE and CSR initiatives (measured as a continuous score between 0% and 100%) from 25 developed and developing countries between years 2002 and 2010, concluding that North American and European firms benefit from such disclosures more than Asian companies. El Ghouli *et al.* (2018) find that firms with higher environmental mitigation activities lower their CoE, considering a sample of 30 countries between years 2002 and 2011. Raimo *et al.* (2020) conclude that there is an inverse relation between ESG disclosures from food and beverage firms and CoE, thereby promoting transparency, competitive advantage and access to additional capital resources. Finally,



Youngkyung and Jungmu (2019) determine the relation between CoE and ESG performance from Korean firms and conclude very specifically that social disclosures drastically decrease equity costs while disclosures on governance have a rather marginal impact.

Thus, we define our first hypothesis next:

*H1.* CoE is negatively influenced by the ESG score of the company.

### 2.2 Stand-alone reports

Since the 1970s, multinational corporations initiated voluntary disclosure of CSR activities (Kolk, 2008). Prior research shows the importance of the stand-alone report, as it diminishes frictions between capital providers and management (Healy and Palepu, 2001; Dhaliwal *et al.*, 2011; Cho *et al.*, 2013), increases confidence from stakeholders and aids firms from sensitive industries decreasing their CoE (Michaels and Gruning, 2017). This is a commonly used proxy for sustainability transparency. CSR reporting companies with a stand-alone report can make their management more easily accountable to the owners of the firm as posited by the agency theory, at the same time increasing corporate reputation and its relationship with a broad range of stakeholders.

Stand-alone reports can be gathered from different sources – for instance, Li and Foo (2015) gather these reports from the websites of the Chinese capital exchanges, and Dhaliwal *et al.* (2011, 2014) gather from corporate register. Li and Foo (2015) conclude that CSR quality disclosure scores reduce CoE in China, and Dhaliwal *et al.* (2014) consider a sample from 31 developed and developing countries, finding a pronounced and inverse relation between CoE and CSR disclosures in stakeholder-oriented countries.

Therefore, we define our second hypothesis as follows:

*H2.* CoE is negatively influenced by the publication of a CSR stand-alone report by the company

### 2.3 External assurance of sustainability reports

The external assurance process enhances the credibility of the CSR report (Global Reporting Initiative, 2013), as it reduces agency conflicts, can help increase legitimacy and respond to stakeholders' need to have more reliable information on ESG. Even though Sierra-Garcia *et al.* (2014) analyze the assurance of sustainable reports in Latin America, finding that it is a growing trend, little is known about the effect of a sustainable behavior on CoE in this specific region.

With an international sample, Garcia-Sanchez *et al.* (2019) analyze the effects of CSR disclosures and external assurance on financial access (though measured through an index of financial ratios, and not CoE), proving that both facilitate financial access, even though the market does not really differentiate amongst the different levels of assurance. If we focus specifically on the link with CoE, Casey and Grenier (2015) conclude that voluntary external assurance of CSR reports disclosed by US firms decreases CoE. Similarly, Martinez-Ferrero and Garcia-Sanchez (2017) conclude that company's CSR reports assured reduced CoE, especially if the assurance is undertaken by a Big Four audit firm. Also in this sense, Weber (2018) finds evidence that the so-called "greenwash firms" (i.e. poor CSR performers that report greater disclosure levels but do not assure the CSR report) have significantly higher CoE. Moreover, Vaz-Ogando *et al.* (2018) indicate that Spanish listed firms related to sensitive industries demand more external assurance services since their purpose is to promote and enhance legitimacy, and, finally, Garcia-Sanchez (2020) classifies social responsible assurance drivers according to institutional, organizational or individual attributes and its impacts as internal (company's financial performance) and external (market reactions).

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Hence, we define our third hypothesis as follows:

*H3.* The assurance of CSR reports negatively moderates the negative relationship between ESG disclosures and CoE.

### *2.4 Capital market integration*

The MILA was born as the virtual market integrated by Lima, Santiago and Bogota stock exchanges in 2011. The Mexican stock market also became a member of MILA in 2014. MILA's objective is to increase market efficiency by allowing investors to negotiate listed shares in its local currency (Lizarzaburu-Bolaños *et al.*, 2015; Espinosa-Mendez *et al.*, 2017). Moreover, the analysis of operating profit (divided by book value and total assets) has a positive effect in projecting portfolio's stock returns, no matter if firms are listed on MILA's or BOVESPA's equity markets (Berggrum *et al.*, 2020a). Finally, the implementation of momentum strategies considering equity portfolios in Brazil and MILA's stock exchanges indicates positive risk-adjusted returns while controlling value, market and size factors (Berggrum *et al.*, 2020b). The fact that the company is listed in this integrated market is expected to amplify the effects on the reduction in CoE of a sustainable behavior as measured by the ESG score, which can be expected according to the three theoretical frameworks as explained in our first hypothesis on ESG.

Consequently, we posit our fourth and final hypothesis:

*H4.* Being listed in MILA negatively moderates the negative relationship between ESG disclosures and CoE.

### **3. Research methodology**

The GMM is implemented in order to address potential endogeneity problems of dynamic unbalanced panel data. Endogeneity is the causal correlation between the dependent variable and the residual error term or the causal relation between variables (Arellano and Bond, 1991). To avoid restrictions regarding instrumental variables, we use the two-step system estimator developed by Blundell and Bond (1998), implemented in Stata by Roodman (2009), which creates a regression model uncorrelated with the error term. Moreover, we implement Hansen's test to measure the over restriction of variables and Arellano and Bond's test for autocorrelation of errors. Blundell and Bond (1998) use first-difference restrictions which improve GMM estimators. This methodological approach is also implemented by Martinez-Ferrero and Garcia-Sanchez (2017), El Ghoual *et al.* (2018) and Li and Liu (2018).

Our data have been obtained from Thomson Reuters I/B/E/S and Eikon database. The sample consists of 2,772 observations, in the period between 2008 and 2018, from 252 publicly traded firms with a market value greater than 4 billion US dollars, and with headquarters in Argentina, Brazil, Colombia, Chile, Panama, Peru and Mexico.

The civil law system is characterized by low legal protection to shareholders and credit providers (La Porta *et al.*, 1998), and the government has a major role in the economy by implementing regulations to protect stakeholders' interests (La Porta *et al.*, 2008; Liang and Renneboog, 2017). In this sense, note that most of the Latin American legal system is based on the Napoleonic Code-Law system (La Porta *et al.*, 2008; Liang and Renneboog, 2017). Table 1 presents the sample composition by country.

CoE is the dependent variable in our model. It is calculated through the price earnings growth model based on Easton (2004) considering a time horizon of two years, taking into account the forecasted earnings per share for year two and year one, and price for a specific period contemplating zero dividend payments. Furthermore, the model establishes a consistent relationship between firm-intrinsic risk and realized expected returns (Weber, 2018).

This *ex ante* approach helps to capture the time variation based on a firm's expected returns (Pastor *et al.*, 2008).

$$\text{CoE}_{i,t} = \sqrt{\frac{\text{EPS}_{(i,t+2)} - \text{EPS}_{(i,t+1)}}{P_{i,t}}}$$

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We estimate the *ex ante* cost by taking into account the analysts' forecasted earnings per share and current market price for individual firms (*i*) and time (*t*), following Reverte (2012) and similar to Martínez-Guerrero and García-Sánchez (2017), Michaels and Gruning (2017), Zhou *et al.* (2017) and Raimo *et al.* (2020).

Regarding control variables, we consider size as the natural logarithm of market capitalization consistent with Sharfman and Fernando (2008), Dhaliwal *et al.* (2011; 2014), Ng and Rezaee (2015), Suto and Takehara (2017) and Breuer *et al.* (2018). We also control for leverage (LVG, as in Xu *et al.*, 2015; Ng and Rezaee, 2015; Kim *et al.*, 2015; Li and Foo, 2015; Martínez-Ferrero and García-Sánchez, 2017; Michaels and Gruning, 2017; Breuer *et al.*, 2018; Gupta, 2018; Weber, 2018). Return on assets (ROA) is taken into account to control for profitability, as in Breuer *et al.* (2018) and Weber (2018). BETA is also controlled for, as it measures firm's systematic risk (Sharfman and Fernando, 2008; Feng *et al.*, 2015; Li and Foo, 2015; Michaels and Gruning, 2017; Breuer *et al.*, 2018). We control for the book to market (BTM) ratio (Reverte, 2012; Feng *et al.*, 2015; Eon and Nam, 2017; El Ghoul *et al.*, 2018). Lastly, several dummy variables are considered for country, industry and year, as in Martínez-Ferrero and García-Sánchez (2017), El Ghoul *et al.* (2018) and Breuer *et al.* (2018).

Table 2 shows the variables' descriptions. The six industrial sectors include technology and telecommunications, petroleum and energy, financial services, commodities, consumption and others – similar to Sierra-García *et al.* (2014)

Table 3 shows the descriptive statistics for each variable used in our analysis. The mean for CoE, LVG, BETA, ROA, BTM, ESG score, CSR reporting, ESGxAssured and ESGxMILA is, respectively, 10.27%, 139%, 71.3%, 7.21%, 6.79%, 16.40%, 57.86%, 7.98% and 3.13%.

Table 4 shows the Pearson correlation matrix and demonstrates an inverse relation between CoE, ESG score and ESGxMILA with a significance level of 5 and 10%. There is no evidence of multicollinearity among the independent variables which is confirmed by a variance inflation factor (VIF) of 2.63, which is much lower than the benchmark level (Cuadrado-Ballesteros *et al.*, 2016; Li *et al.*, 2017; Ahmed *et al.*, 2019).

#### 4. Results

In this section, we present our model to contrast the four hypotheses by regressing CoE on sustainable and control variables with the panel data. In the model equation, *i* stands for companies, *t* for years (2008–2018) and  $\mathcal{E}$  for the residual error term. To mitigate the causal

	Number of firms	Observations	Percentages
Argentina	50	550	19.84
Brazil	88	968	34.92
Chile	12	132	4.76
Colombia	9	99	3.57
Mexico	75	825	29.76
Panama	4	44	1.59
Peru	14	154	5.56
Total	252	2,772	100

**Note(s):** The sample covers the time span from 2008 to 2018

**Table 1.**  
Sample distribution  
per country, showing  
number of firms,  
observations and  
percentages

## Anexo 2. Sustainability engagement in Latin America firms and cost of equity

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Variable - label	Description
Cost of equity – CoE	Calculated according to Easton (2004) price earnings growth model – continuous variable
Beta	Firms' systematic risk – continuous variable
Leverage	Total debt divided by total equity – continuous variable
Size	Natural logarithm of market capitalization – continuous variable
Book to market	Book value divided by market value of firm – continuous variable
Return on assets	Net earnings divided by total assets – continuous variable
ESG score	Sustainable performance score measured by 10 categorical pillars (resource use, emissions, innovation, management, shareholders, csr strategy, workforce, human rights, community, product responsibility) – value between 0% and 100% – continuous variable
CSR reporting	Firms issue stand-alone reports (1 firms issue CSR reports, 0 otherwise) - dummy variable
ESG × assured	Firm's ESG disclosures assured by external assurance providers – continuous variable
ESG × MILA	ESG disclosure from firms trading in Latin America integrated market – continuous variable
Country	Seven countries part of the firm's sample (1 if country is considered, 0 otherwise) – categorical variable
Industry	Six industrial sectors (1 if industry sector is considered, 0 otherwise) – categorical variable
Year	Time period between 2008 and 2018 (1 if year is considered, 0 otherwise) – categorical variable

**Note(s):** The six industrial sectors include technology and telecommunications, petroleum and energy, financial services, commodities, consumption and others, similar to Sierra-Garcia *et al.* (2014). The seven countries can be seen in Table 1

**Table 2.**  
Variable description

Variable	Mean	Std Dev	Max	Min	25th percentile	50th percentile
CoE	0.1027322	0.19686	4.062624	-0.0087472	0.002643	0.0541704
LVG	1.390998	4.686709	135.1634	0.00000260	0.2597209	0.6455913
BETA	0.713858	0.7240122	5.145154	-14.564	0.46	0.755
ROA	0.0721692	0.2916561	6.279801	-4.171774	0.0150894	0.0388976
SIZE	6.975038	2.32841	12.34194	-3.506558	5.826484	7.309488
BTM	0.0679132	1.152887	14.55563	-29.70588	0.0047585	0.016572
ESG	0.164087	0.2560335	0.955026	0	0	0
CSR Reporting	0.5786436	0.4938655	1	0	0	1
ESG × Assured	0.0798877	0.2091795	0.955026	0	0	0
ESG × MILA	0.0313235	0.1289261	0.8906818	0	0	0

**Table 3.**  
Descriptive statistics:  
Mean, standard  
deviation, quartiles for  
the dependent and  
independent variables

relation, leverage, BETA and size are implemented as instrumental variables according to Li and Liu (2018) and Nashier and Gupta (2020).

Model

$$\begin{aligned}
 \text{CoE}_i = & \alpha_i + \beta_1 \text{ESG Score}_i + \beta_2 \text{CSR Reporting}_i + \beta_3 \text{ESG} \times \text{Assurance}_i \\
 & + \beta_4 \text{ESG} \times \text{MILA}_i + \beta_5 \text{LVG}_i + \beta_6 \text{ROA}_i + \beta_7 \text{BTM}_i + \beta_8 \text{SIZE}_i + \beta_9 \text{BETA}_i \\
 & + \sum_{j=1}^7 \beta_j \text{Country}_i + \sum_{j=1}^6 \beta_j \text{Industry}_i + \sum_{j=1}^{11} \beta_j \text{Year}_i + \epsilon_i
 \end{aligned}$$

## Anexo 2. Sustainability engagement in Latin America firms and cost of equity

	1	2	3	4	5	6	7	8	9	10
CoE	1									
LVG	0.0368*	1								
BETA	0.0662*	-0.2263*	1							
ROA	-0.0543*	-0.0293	-0.0480*	1						
SIZE	-0.0526*	-0.0711*	0.1278*	-0.1476*	1					
BTM	-0.004	-0.009	0.0507*	-0.0355*	0.0688*	1				
ESG	-0.0690**	0.0716*	-0.0438	-0.0629*	0.2626*	-0.0663*	1			
CSR Reporting	0.0425*	0.0221	-0.0153	-0.0254	0.1471*	0.017	-0.1088*	1		
ESG × Assured	-0.0033	-0.0109	0.0473*	-0.0181	0.3604*	0.0032	0.5363*	0.0256	1	
ESG × MILA	-0.0643*	-0.0072	0.0984*	-0.0131	0.2277*	-0.0106	0.1432*	0.0478*	0.2518*	1

**Note(s):** Coefficients with asterisks are statistically significant: \*\*\*1%, \*\*5%, \*10%. Variance of inflation factor (VIF) is implemented to confirm there is no multicollinearity amongst variables

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**Table 4.**  
Pearson correlation  
coefficients

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**Table 5.**  
The empirical relation between cost of equity, sustainable and control variables

	Panel A		Panel B		Panel C		Panel D	
	Coefficient	Std error	Coefficients	Std error	Coefficients	Std error	Coefficients	Std error
ESG Scores	-0.5473925***	0.1576027	-0.114207***	0.0096786	-0.0920039***	0.0133866	-0.0764144***	0.0162348
CSR Reporting			-0.0915466***	0.0112801	-0.0943197***	0.0112311	-0.08538649***	0.0122361
ESG × Assured					-0.0466034**	0.0214567	-0.0423808**	0.0194292
ESG × M/LA							-0.2343331**	0.074538
LVG	0.0657195*	0.053759	0.0028867***	0.0004173	0.0029074***	0.0004265	0.003001***	0.0004135
ROA	0.2627912	0.359045	-0.0309312	0.0190017	-0.0308021	0.0197898	-0.0084375	0.0221419
BTM	0.1408314	0.1285107	0.1176979***	0.0024495	0.1170224***	0.0024702	0.1167349***	0.0027115
SIZE	-0.1135497*	0.0646563	-0.0000278	0.0040527	0.0019489	0.0039151	0.0003802	0.0043136
BETA	0.4771601***	0.1447261	0.0162833**	0.0054277	0.01634**	0.0035913	0.0136883**	0.0057071
COUNTRY	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
INDUSTRY	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
YEAR	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Statistically Significant at *10% **5% ***1%								
<i>Hansen test</i>								
	Prob > Chi <sup>2</sup>	0.117	Prob > Chi <sup>2</sup>	0.198	Prob > Chi <sup>2</sup>	0.169	Prob > Chi <sup>2</sup>	0.154
<i>Arellano and Bond test for AR(2)</i>								
	Prob > Z	0.534	Prob > Z	0.315	Prob > Z	0.312	Prob > Z	0.314

**Notes(s).** The table implements the two-step generalized method of moments (GMM) taking into account two robustness test. Firstly, the Hansen's test measures the overidentification of variables, and results greater than 0.05 show that instruments are valid. Secondly, the Arellano-Bond test analyzes the autocorrelation of errors and results with probability for Z value greater than 0.05 evidence of no serial correlation

Table 5 shows the results of the model taking into account the hypotheses and control variables. Firstly, panel A shows a negative relation between CoE and ESG disclosure ( $-0.547$ ), with a significance level of 1%. Therefore, our conclusions indicate that Latin American firms with greater ESG scores have a lower CoE. This result is consistent with findings in other jurisdictions such as in Feng *et al.* (2015), El Ghoul *et al.* (2018), Li and Liu (2018), Breuer *et al.* (2018), Ahmend *et al.* (2019), Raimo *et al.* (2020) and partially with Youngkyung and Jungmu (2019).

The voluntary disclosure of CSR reports impacts CoE negatively and significantly. Its coefficient in panel B is  $-0.091$ , with a significance level of 1%. As a consequence, hypothesis 2 cannot be rejected, and our results are consistent with Dhaliwal *et al.* (2014), Li and Foo (2015) and Michaels and Gruning (2017).

Regarding the moderating effects of the assurance of CSR reports by third-party members on the relationship between ESG and CoE in panel C, the coefficient ESGxAssured is  $-0.0466$  with a statistical significance level of 5%. Consequently, hypothesis 3 is ratified as the firm's decision to assure CSR reports lower equity cost, which is line with Casey and Grenier (2015), Martinez-Guerrero and Garcia-Sanchez (2017) and Weber (2018).

Finally, in panel D, the ESGxMILA coefficient is  $-0.2343$ , with a statistical significance of 5%. Therefore, we accept that being listed in MILA increases the reduction of CoE due to ESG, and thus we accept the fourth hypothesis.

Some control variables are also evidenced to have an impact on CoE. The coefficient for leverage in panel A is 0.095, with a significance level of 10%; in panel B, coefficient is 0.0028; panel C 0.0029; and panel D 0.0030, all with a significance level of 1%. These results are consistent with Dhaliwal *et al.* (2014), Martinez-Ferrero and Garcia-Sanchez (2017), Gupta (2018) and El Ghoul *et al.* (2018). Hence, we demonstrate that Latin American firms with greater levels of debt have higher CoE since capital lenders demand higher returns to compensate for the risks of this financial condition. In the same sense, BETA's coefficient in panel A (0.477) is statistically significant at 1%; in panel B (0.016), panel C (0.0163) and panel D (0.0156), coefficients are also positive with a significance level of 5%, indicating a direct relation between firm's systematic risk and CoE, as evidenced by Feng *et al.* (2015) and Breuer *et al.* (2018). The BTM ratios in panel B (0.1176), panel C (0.1170) and panel D (0.1167) are positive and significant at 1%, as in Fama and French (1992), Dhaliwal *et al.* (2014), Feng *et al.* (2015), Breuer *et al.* (2018) and El Ghoul *et al.* (2018). Size is only significant at 10% in panel A ( $-0.1135$ ), thus indicating that firms with higher market capitalization have lower equity cost and finally ROA is not statistically significant in any of the panels.

To provide robustness tests for our results, we implement the Hansen test for overidentifying restrictions and Arellano-Bond for autocorrelation of errors. Results shows a  $p$ -value of 0.117 in panel A, in panel B 0.198, panel C 0.169 and panel D 0.154. Consequently, our instrumental variables can be considered valid, and we do not reject the hypotheses of overidentifying restrictions. Moreover, the Arellano-Bond result (AR2) in panel A is 0.534, in panel B 0.315, panel C 0.312 and panel C 0.314. Therefore, we can accept the hypotheses of no serial correlation because probability of  $Z$  value is higher than 0.05.

## 5. Conclusions and recommendations

The relationship between business and society considering the evolution of ESG in Latin America has been looked into since the 1980s (Reficco and Ogliastrì, 2009). Large-size firms evolved from corporate philanthropy to corporate sustainable development by disclosing company's social, environmental activities and corporate governance practices to promote legitimacy amongst stakeholders. As a consequence, the concept of "social business" consists of the interaction between social entrepreneurship, inclusive businesses, not-for profit organizations and business firms' non-financial disclosures. In fact, all types of firms,

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including publicly traded companies which have higher visibility, try to increase their legitimacy with “social investments” and therefore disclose detailed information regarding their environmentally and socially sustainable activities (Ogliastri *et al.*, 2015).

The contribution of this paper confirms the benefits in Latin America of being socially responsible and having a transparency policy in this field, as this behavior is evidenced to reduce CoE. Our findings are new in this geographical context and prove that agency cost frictions between investors and stakeholders are reduced by disclosing voluntarily non-financial information (Martinez-Guerrero and Garcia-Sanchez, 2017; El Ghoual *et al.*, 2018; Gupta, 2018), making equity costs less expensive (Dhaliwal *et al.*, 2014; Feng *et al.*, 2015; Gupta, 2018; Raimo *et al.*, 2020; Ahmed *et al.*, 2019). Our study is also very innovative and valuable, as it proves that integration of capital markets and assurance of the CSR report can reinforce the reduction in CoE due to sustainable behavior. Prior research has focused mostly on developed countries, but no data panel study has expanded yet this type of research to Latin America to analyze the mitigating CSR effect on CoE. Teti *et al.* (2016) analyze the link between corporate governance practices from Latin American firms and CoE implementing ex post model such as capital asset pricing model (CAPM) (Sharpe, 1964; Linter, 1965) considering the board of directors composition and shareholder’s ownership rights. Our study does not focus on the effect of corporate governance but on sustainable behavior and uses *ex-ante* proxy models which are more robust than ex-post models and have not been implemented in this region yet. However, our proposal has limitations since data sources on the sustainability profile of the companies in this region are rather limited.

Our results have practical implications for regulators, firm’s management, capital providers and stakeholders. Regulators can be encouraged by our research to promote sustainable policies in the capital markets, as companies will benefit from lower capital costs and the planet itself will improve as the result of a more sustainable corporate behavior. In fact, our research may encourage market regulators to promote CSR mandatory guidelines. As a reference, national regulators in Latin American countries may implement a legal framework directed to listed firms to disclose non-financial information to stakeholders in a similar way to the European Directive 2014/95/EU (2014). Moreover, regulators should focus on implementing surveillance frameworks to increment firm’s fundamentals, adapt international corporate governance practices and improve equity market infrastructure (Mishra and Mishra, 2020). From a management point of view, our findings support the publication and assurance of CSR reports in order to reduce equity costs, and may help increment capital resources from SRI funds (Reverte, 2012; Gupta, 2018). As regards capital providers, even though institutional investors may feel less attracted to sensitive-polluting environmental firms, ESG disclosures can help to mitigate negative externalities and agency costs since management may be incentivized to implement sustainable activities and thus avoid firm takeovers in financial opaque countries. Last but not least, the integration of capital markets (e.g. in MILA) has been found to amplify the effects of COE reduction of sustainability disclosures, so capital markets and their participants can be drivers for a more sustainable environment if integration is further promoted in the region.

Our study opens up new avenues for future research. For instance, it might be very interesting to expand this line of research in the Latin American context by looking into the relationship between CoE and the existence of a CSR board committee (Toth, 2017), and also the link between CSR quality disclosures and capital constraints (Cheng *et al.*, 2014; Garcia-Sanchez *et al.*, 2019). Additionally, our study may encourage scholars to investigate ESG disclosures from controversial industries in Latin American and its implication for CoE (Hmaitane *et al.*, 2019). Finally, future studies on sustainable behavior in Latin America may look into the link not only with COE but also with debt maturity (Benlemlih, 2017) and cost of debt (Bhuiyan and Nguyen, 2019) and the progressive introduction of the Sustainable Development Goals in firms’ CSR strategy (Martinez-Ferrero and Garcia-Meca, 2020).



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**ANEXO 3. EFFECTS OF CARBON EMISSIONS,  
ENVIRONMENTAL DISCLOSURES AND CSR ASSURANCE ON  
COST OF EQUITY IN EMERGING MARKETS**





Article

## Effects of Carbon Emissions, Environmental Disclosures and CSR Assurance on Cost of Equity in Emerging Markets

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**Abstract:** The objective of the paper is to empirically test the relation between carbon emissions, environmental disclosures, assurance of sustainability reports and firms' Cost of Equity (COE) measured by an Ex-Ante proxy model. The methodological approach uses the Generalized Method of Moments (GMM) required to control endogeneity problems using a sample of 929 firms that are included in the Morgan Stanley Emerging Market Index. The data panel includes 5328 observations from 30 emerging countries covering the period 2014 to 2019. Our results indicate that firms with higher carbon emissions have higher COE, which implies that capital providers penalize highly polluting firms. Contrarily, evidence shows that firms with greater environmental disclosures, and the those who externally assure their corporate social responsibility reports decrease their COE. Our study expands the literature regarding carbon emissions and its relation with firms' COE from an emerging market perspective covering a multi-country sample, with findings that confirm that higher emitters are penalized in terms of COE. Moreover, our research confirms in this setting the negative relation between environmental, social and governance disclosure scores and COE. Moreover, we evidence as well that the assurance of sustainability reports also promotes legitimacy and decreases information asymmetries, in the sense of reducing COE. The value of our findings is especially relevant as it may encourage listed companies in emerging countries to engage in more sustainable practices—e.g., reduce carbon emissions.

**Keywords:** CO<sub>2</sub> emissions; Cost of Equity; assurance; environmental disclosure; emerging markets



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### 1. Introduction

Nowadays, climate change has become an important subject for the global economy. Many countries have defined targets for carbon emission reductions by 2030—e.g., the European Union aims to reduce Greenhouse Gas (GHG) emissions by 40% and China aims to do so by 65% by implementing an emission trading scheme similar to the European Union's [1]. There is a global concern on GHG emissions because with no further actions to reduce them, global warming is expected to increase by 2 degrees Celsius above the pre-industrial baseline. Moreover, climate change disasters are accountable for 3 billion US dollars in economic losses claiming 1.3 million lives between 1998 to 2017 [2]. Nowadays, just 12 countries in the world (i.e., the G7—France, Germany, Italy, Japan, the United Kingdom, the United States and Canada—and the BRICS—Brazil, Russia, India, China, and South Africa—considered a “rising power” by Lemma et al. [3] are responsible for 60% of global Greenhouse Gas (GHG) emissions as in 2017 [4].

Over the counter and equity markets may represent a source of capital to finance activities related to the 13th Sustainable Development Goal (climate action) taking into account disclosures on Environmental, Social and Governance (ESG) or (Corporate Social Responsibility (CSR) reporting. This way the “financing gap” can be filled with assets over 900 billion US dollars on Index funds which consider emerging countries as an attractive

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region to obtain sustainable returns. As a reference, China holds 7 billion US dollars on sustainable assets as of 2019 [5].

The vast literature regarding carbon emissions has been widely studied considering different perspectives. For the purpose of our study, note that environmental disclosures [6–8], CSR-ESG scores [9–11], GHG emissions [12,13] and carbon disclosure scores [3] have already been evidenced as factors that reduce Cost of Equity. Hence, there is evidence of a negative relation both taking into account ex-post returns [14] and ex-ante returns [12,15–17], thus reducing agency frictions and increasing the firm's legitimacy among stakeholders. However, according to Bui et al. [18], the majority of studies on sustainability and financial performance have focused on accounting-based performance ratios [19–21] or market returns in developed [22–24] and developing markets [25]. Therefore, the objective of this paper is to obtain empirical evidence on the relation between the Cost of Equity (COE) measured by Easton's [26] Price-Earnings growth model and firms' GHG emissions, environmental scores, and the assurance of sustainability reports, as proxies of sustainable behavior in emerging markets. COE is the percentage return demanded by investors in the long-run by sacrificing liquidity in the short-run or the rate required to discount firms' expected cash flows [10,27].

The sample consists of 929 publicly traded firms from 30 countries included in the Morgan Stanley Emerging Market Index from 2014 to 2019. Our study makes a relevant contribution to the existing literature since it uses a cross-country sample of 5328 firm-year observations in emerging markets, proving a positive relationship between Cost of Equity and GHG emissions while the opposite holds as regards to the link between.

The rest of this paper is structured as follows. Section 2 presents the theoretical framework, literature review and hypotheses development, Section 3 explains the research methodology, Section 4 discusses the results obtained and finally, Section 5 closes this paper with the conclusions and ideas for future research.

### 2. Theoretical Framework, Literature Review and Hypotheses Development

Under the Agency Theory framework, information asymmetry is expected to lead to greater stockholders' demands on stock returns [28] or decrease asymmetries between firms and capital providers by disclosing analyst reports [17]. As a result, firms' management may decide to disclose financial and non-financial information to eliminate these asymmetries to avoid company takeover and decrease monitoring costs borne by investors [29]. Firms' management may possess private information on carbon emissions and strategies not disclosed to stakeholders [30] but equity markets can play an important role in monitoring firms' environmental disclosures, also on emerging economies [31]. On the other hand, carbon information disclosures increase firms' transparency and decrease financial risk [32] helping firms to reduce information asymmetries [15] and being carbon disclosures as relevant variable to analyze firms' risk profiles [22]. GHG information is one aspect within the environmental disclosures that companies publish [21], and existing research proves that the voluntary disclosure of GHG emissions has a negative effect on equity value [24].

The Stakeholder Theory provides a framework that establishes that firms are accountable not only to investors but also to all stakeholders, since the latter have different demands. Thus, the company needs to provide information and avoid conflicts [33]. Moreover, the firm's purpose is to satisfy internal and external stakeholders' demands by disclosing ESG activities and increment financial performance [25], reduce adverse events such as product recalls, strikes, and environmental scandals by having good relations with stakeholders [7]. In this sense, firms' carbon disclosures reduce frictions by providing extensive information to stakeholders [18]. Several empirical studies have analyzed the relation between carbon disclosure scores and COE. Albarrak et al. [16] analyze carbon information disclosures through social networks and conclude that *Icarbon* (number of tweets related to Carbon information disseminated by firms through Twitter) reduces COE. Moreover, stakeholders pay additional attention to *Icarbon* disclosures compared to more general environmental scores. Contrary, in an emerging market setting, the analysis between ESG scores from

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Malaysian firms and COE indicates a non-significant relation probably due to investor's low confidence in environmental scores [25] which is in line with Feng et al.'s [34] results.

The Legitimacy Theory can also provide a suitable framework for our research. Organizations are categorized as legitimate when audiences perceive them as institutions defending social principles and values and not just private firms' interests [35]. Moreover, disclosing environmental and social activities improves the firm's reputation amongst a wider group of stakeholders [36] and a social contract with stakeholders is accomplished when carbon information is disclosed [37] as well other information on ESG, especially if this information is externally assured. However, companies are severely penalized by market participants when GHG emissions are not fully disclosed [22]. Along the same lines, the study of carbon information disclosure by Chinese firms and market value considering COE indicates that carbon disclosures reduce COE incrementing share's liquidity, market value so that one may conclude that investing in carbon management activities leads to more financial benefits [38]. In addition, media reporting leads to a quality increase in carbon information disclosure and to a reduction in COE of Chinese polluting-listed firms, improving the firms' image and legitimacy to different stakeholders [13]. In fact, evidence obtained indicates that disseminating carbon information with Twitter shows that firms are committed to enhance their legitimacy by helping capital providers to evaluate firms' risk to improve their investment decisions [16].

Last but not least, the Voluntary Disclosure Theory states that good firm performers possess and disclose voluntarily information compared to results provided by poor performers and help stakeholders to take decisions [1,39,40]. Based on the abovementioned, the contribution by Albarrak et al. [16] considering a sample of US firms indicates that carbon disclosures disseminated by Twitter help investors know firms' carbon inventory and provide valuable information for investment decisions. Similarly, Lemma et al. [3] with a sample of South African listed firms conclude that carbon disclosures help reduce firms' risk and avoid pessimistic reactions on market participants in the Johannesburg Securities Exchange.

Existing research has used the above mentioned frameworks to analyze the impact of sustainable behavior on COE. This relation between has been studied considering developed and developing economies. As a reference, the voluntary disclosure of CSR from North America listed firms demonstrates a negative relation with COE according to Sharfman and Fernando [6], Dhaliwal et al. [9] and El Ghoul et al. [10]. Moreover, considering multi-country samples, the link between CSR and COE is more significant in stakeholder-oriented countries [41] or countries with weak governance levels [8] where there is an increasing trend of Social Responsible Investment funds investing in sustainable firms. The link between Corporate Environmental Responsibility (CER) and COE from 30 countries, shows also a negative relation [7]. Regarding GHG emissions, the direct link between carbon intensity and COE is also evidenced taking into account a sample of Korean listed firms [12], confirming that capital providers penalize polluting companies. Along the same lines yet, considering a sample of 34 countries, results show that companies' GHG emissions and COE are positive and the latter relation is more pronounced in developing economies [18].

The Carbon Disclosure Project (CDP) is an important reference for measuring carbon emissions including different topics such as firms' management and inventory emission, GHG accounting, and climate change. The responses are obtained through questionnaires and promote transparency and commitment by organizations to fight climate change [32,42]. Different contributions consider CDP data in an emerging economies setting. For instance, the relation between carbon disclosures and COE with a sample of South African firms confirms that COE is negatively related to voluntary disclosures since the quality of carbon information disclosures rewards companies with cheaper equity costs [3]. Similarly, but from a different country perspective, the study of carbon disclosures, COE and media reporting taking into consideration a sample of highly-polluting firms from Shanghai and Shenzhen equity exchanges, highlights that the disclosure of financial and non-financial

carbon information are negatively related with COE as well as media reporting with COE [13]. The negative relation between the quality of carbon emission disclosures and COE is again corroborated considering as a moderating variable the different levels of marketization in the regions of the Chinese economy [15]. Contrary to the latter literature, the relation between GHG emission intensity and COE remains positive taking into account a sample of firms from developed and developing countries as in Bui et al. [18].

Following previous literature, we propose our first hypothesis:

**Hypothesis 1 (H1):** *Cost of Equity is positively influenced by GHG emissions.*

Sharfman and Fernando [6] conclude that improving and disclosing environmental risk management information leads to a reduction in COE. Taking into consideration multi-country sample studies, Ng and Rezaee [43] find a negative relation between Environmental and Governance sustainability performance with COE, and El Ghoul et al. [7] estimate that CER Scores decrease firms' environmental expenses thereby decreasing COE. Gupta [8] demonstrates that good environmental practices lead to a reduction in COE especially in weak-governance countries facilitating investment options for Social Responsible Investment Funds. Raimo et al. [44] also confirm the inverse relation between ESG disclosures from Food and Beverage sector firms and COE. Lastly, in an emerging market setting such as Malaysia, Shad et al. [14] evidence that sustainability and economic reporting from the oil and gas industry decrease COE. Therefore, we present the second hypothesis of our study:

**Hypothesis 2 (H2):** *Cost of Equity is negatively influenced by firms' ESG scores.*

Stand-Alone reports (also called sustainability or CSR reports) offer information about the firm's commitment, endeavors, and policy indicators related to sustainable development required in the decision-making process of the company's stakeholders [45]. The assurance of CSR reports gives higher credibility to those reports as an external verification process [46,47] especially in countries with great stakeholder demand for sustainable practices [48]. The negative relation between COE and CSR assurance has been evidenced by existing research. For example, Casey and Grenier [49] conclude that the voluntary assurance of CSR report reduces COE and the reduction increments when the assurer is an accountancy firm. Moreover, Martinez-Ferrero and Garcia-Sanchez [50] evidence lower COE when the assurance provider is a Big4 audit firm. Finally, Weber [51] analyzes the assurance practice and Global Reporting Initiative (GRI) reporting levels, concluding that poor CSR performers reporting at high GRI levels decrease COE when their CSR report is assured. Therefore, we present our third and final hypotheses:

**Hypothesis 3 (H3):** *Cost of Equity is negatively influenced by the assurance of CSR Reports.*

### 3. Research Methodology

The Morgan Stanley Emerging Market Index includes over 1300 large and mid-cap securities from 27 emerging countries across the world. Data from companies belonging to that index were retrieved from the Thomson Reuters Eikon database including sustainable and control variables as well as the data from International Broker Estimates (I-B-E-S) required to compute the Cost of Equity. The period covered is from 2014 to 2019.

Consequently, an unbalanced dynamic panel data of 5328 firm-year observations and 929 publicly trading firms was obtained with a market value greater than 4 billion US dollars. Our methodological approach uses Generalized Method of Moments (GMM) by Blundell and Bond [52]. Furthermore, to provide robustness, the Hansen's Test is implemented to measure if there is over-identification of variables as well as the Arellano and Bond's test for autocorrelation of errors. The GMM model is used to mitigate endogeneity defined as the causal correlation between the explanatory variable with the error term [53], and has already been implemented by Martinez-Ferrero and Garcia Sanchez [50];

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El Ghouli et al. [7] and Gupta [8]. Lastly, we lagged the dependent variable according to Nelling and Webb [54] and El Ghouli et al. [7].

The model is as follows:

$$COE_{it} = \beta_0 + \beta_1 COE_{i,t-1} + \beta_2 Co2Emissions_{it} + \beta_3 EnvDisclosure_{it} + \beta_4 CSR Assurance + \beta_5 BETA_{it} + \beta_6 BTM_{it} + \beta_7 ROA_{it} + \beta_8 SIZE_{it} + \sum_{j=1}^{12} \beta_j Industry_{it} + \sum_{j=1}^6 \beta_j Year_{it} + \sum_{j=1}^6 \beta_j Regions_{it} + \epsilon_{it} \tag{1}$$

Table 1 details the number of observations according to the six global regions defined by Sethi et al. [48]. The three most represented emerging regions in our sample are: East Asia capturing the majority of observations (55.74%), the South Asian region with 17.79% of the total observations and Latin America with 10.47%.

**Table 1.** Firm year observations for Regions.

	Observations	Percentages
East Asia (China, South Korea, Hong Kong, Philippines, Taiwan)	2970	55.74%
Eastern Europe and Central Asia (Cyprus, Czech Republic, Greece, Hungary, Poland, Russia, Turkey)	384	7.21%
Latin America and Caribbean (Argentina, Bermuda, Brazil, Cayman Island, Chile, Colombia, Mexico, Peru)	558	10.47%
Middle East and North Africa (Egypt, Qatar, Saudi Arabia, United Arab Emirates)	222	4.17%
South Asia (India, Indonesia, Malaysia, Pakistan, Thailand)	948	17.79%
Sub-Saharan Africa (South Africa)	246	4.62%
Total	5328	100%

Table 2 shows the number of observations considering industrial sectors as in Cordova et al. [55]. The financial sector provides 21.06% of observations while industrials and energy clusters include 17.79% and 12.50% of the total observations, respectively.

**Table 2.** Firm-year observations per Industries.

	Observations	Percentages
Consumer Discretionary	576	10.81%
Consumer Staples	492	9.23%
Energy	666	12.50%
Financials	1122	21.06%
Healthcare	264	4.95%
Industrials	948	17.79%
Information Technology	270	5.07%
Materials	72	1.35%
Real Estate	282	5.29%
Telecommunication Services	222	4.17%
Transportation	228	4.28%
Utilities	186	3.49%
Total	5328	100%

#### 3.1. Dependent Variable

COE is the dependent variable in the GMM models. It is computed taking into account the Price-Earnings Growth Model by Easton [26]. It considers the forecasted earnings per

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share for year 2, earnings per share for year 1 divided by the target price for a specific firm, and time period. Moreover, the model considers the assumption of zero dividend payments and no abnormal earnings growth. Botosan and Plumlee [56] indicate that this model is predictable and consistent with leverage, market risks, growth, and residual returns and Pastor et al. [57] demonstrate that ex-ante results capture time variations in expected returns. This model is implemented by Kim et al. [12], Li et al. [15], Yao and Liang [17] and Bui et al. [18].

$$COE_{it} = \sqrt{\frac{EPS_{it+2} - EPS_{it+1}}{P_{it}}} \tag{2}$$

#### 3.2. Sustainable and Control Variables

Regarding sustainable variables, and as explained in the hypotheses development section, carbon emissions is expected to have a positive sign according to Kim et al. [12] and Bui et al. [18], whereas ESG Scores is expected to have a negative sign (as in Sharfam and Fernando [6]; El Ghoul et al. [7]; Gupta [8], and Shad et al. [14] as well CSR assurance (Martinez-Ferrero and Garcia-Sanchez [50] and Weber [51]).

Concerning control variables, Beta is expected to have a positive coefficient since higher systematic risk should lead to higher COE as in Albarrak et al. [16] and Li et al. [15]. We also consider size as a control variable according to Dhaliwal et al. [9,41] and Yao and Liang [17], return on assets (ROA) to capture firms' profitability as in Li et al. [13]; Gupta [8]; Bui et al. [18] and Shad et al. [14] and finally Book-to-Market as in Kim et al. [12]; El-Ghoul et al. [7]; Li et al. [15] and Albarrak et al. [16].

Table 3 describes the variables studied in our model.

Table 3. Variable Description.

Variable-Label	Description
Cost of Equity—COE	Calculated according to Easton (2004) Price Earnings Growth Model—Continuous Variable
Beta	Company's Systematic Risk—Continuous Variable
Book to Market	Book Value divided by Market Value of Firm—Continuous Variable
Return on Assets	Net Earnings divided by Total Assets—Continuous Variable
Size	Natural Logarithm of Market Capitalization—Continuous Variable
Carbon Emissions	Natural Logarithm of Carbon Emissions measured in tones disclosed by firms equivalent to the sum of Scope 1 (direct emissions) and Scope 2 (indirect emissions)—Continuous Variable.
Environmental Score	Sustainable score disclosed by firms' technology implemented to reduce environmental expenses, develop eco-friendly products and services and reduce negative externalities to stakeholders-value between 0% to 100%—Continuous variable
CSR Assurance	The CSR report can be assured by a third-party to give it more credibility—Categorical Variable (1 if CSR Report is Assured, 0 otherwise)
Regions	Six Global Regions according to Sethi et al. [48]—Categorical Variable
Industry	Twelve industrial sectors according to Cordova et al. [55] (1 if that specific industry sector is considered, 0 otherwise)—Categorical Variable
Year	Time period between 2014 to 2019 (1 if that year is considered, 0 otherwise)—Categorical Variable

Table 4 shows the descriptive statistics for each of the variables. For instance, the average mean for COE, CO<sub>2</sub> emissions and Environmental Disclosures is 14.5, 12.51, and 40.4%.

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Table 4. Descriptive Statistics.

Variable	Mean	Std Dev	Max	Min	25th Perc	50th Perc
COE	0.1455888	0.18763	3.065668	0	0.0335808	0.1010091
BETA	0.8352038	0.5668023	2.962036	0.50104620	0.4526645	0.8714394
SIZE	8.949815	1.011018	13.10956	4.18735	8.2604	8.846894
BTM	12.72248	47.06825	687.5413	-8.648931	0.6042406	1.389203
ROA	0.0604599	0.0741281	1.688215	-0.7492324	0.0162838	0.0441098
CO <sub>2</sub> emissions	12.50739	2.534687	19.63255	2.639057	10.61965	12.26111
Env Disclosures	0.4044543	0.2355073	0.5564804	0	0.000000000000971	0.5372499
CSR Assurance	0.7601053	0.4270592	1	0	1	1

Table 5 presents the Pearson correlation matrix. Results indicate a positive relation between carbon emissions and COE with a significance level of 1%. The Variance of Inflation Factor (VIF) is 2.56 so there is no evidence of multicollinearity among the independent variables because it is well below the benchmark of 10 as in Matsumura et al. [22]; Griffin et al. [24] and Shad et al. [14].

Table 5. Pearson Correlation Coefficients.

	1	2	3	4	5	6	7	8
COE	1							
BETA	-0.0967	***	1					
BTM	-0.0329	*	0.0133	1				
ROA	-0.0229	*	-0.1409	***	1			
SIZE	0.0026		-0.0082	-0.015	0.0668	***	1	
CO <sub>2</sub> emissions	0.0637	***	0.0034	0.0634	***	-0.0365	**	0.2189
Env Disclosures	0.1924	***	-0.0252	*	-0.0166	-0.013	0	-0.1594
CSR Assurance	0.2016	***	-0.0238	*	-0.014	-0.0276	**	0.0257

Coefficients with asterisk are statistically significant \*\*\* 1% \*\* 5% \* 10%. Variance of Inflation Factor (VIF)—2.56.

#### 4. Results

Based on the regression model, we proceeded to calculate our results implementing the Generalized Method of Moments and thereby contrasted our three hypotheses fragmented into three panels explained in Table 6.

Table 6. Results of the Generalized Method of Moments (GMM) Model.

	Panel A			Panel B			Panel C		
COE(t-1)	Coefficient	Std Error		Coefficients	Std Error		Coefficients	Std Error	
CO <sub>2</sub> emissions	0.0893063	0.0234461	***	0.086111	0.0305917	**	0.0739626	0.0212098	
	0.0270805	0.0101143	**	0.0468988	0.0180089	**	0.0401803	0.0101604	
				Env Disclosures	-0.4290792	***	0.095325	0.0210854	
				CSR Assurance	-0.4630317	*	0.2439497		
BETA	0.0746554	0.0384344	*	BETA	0.0730321	0.0600427	BETA	0.055466	
BTM	0.0001256	0.0002122		BTM	0.0000425	0.0005843	BTM	0.0003548	
ROA	0.5990877	0.1864954	**	ROA	0.8414732	**	0.3380303	0.0001826	
SIZE	-0.0507759	0.0251154	**	SIZE	-0.1219857	**	0.0515535	0.153373	
Region		Controlled		Region		Controlled	Region	0.022919	
Industry		Controlled		Industry		Controlled	Industry	Controlled	
Year		Controlled		Year		Controlled	Year	Controlled	
Hansen Test	Prob > Chi <sup>2</sup>	0.110		Hansen Test	0.613		Hansen Test	0.128	
Arellano and Bond Test for AR(2)	Prob > Z	0.466		Arellano and Bond Test for AR(2)	0.307		Arellano and Bond Test for AR(2)	0.363	

Generalized Method of Moments—Two Step Statistically Significant at \* 10% \*\* 5% \*\*\* 1%.

Firstly, Panel A indicates a positive relation between carbon emissions (0.027) and COE with a significance level of 5%, which is also ratified in Panel B and Panel C shows a significance level of 1% (when the other hypotheses are also tested). Therefore, regarding our first hypothesis, we can conclude that firms with higher carbon emission intensity

are penalized with greater equity cost. Our result is in line with Kim et al. [12] and Bui et al. [18].

Secondly, Panel B shows a negative relation between environmental disclosures ( $-0.4290$ ) and COE with a significance level of 1% which is also confirmed by Panel C. Consequently, we do not reject the second hypotheses, arriving at consistent findings with El Ghouli et al. [7] and Gupta [8], in the sense that the investors tend to accept less returns from sustainable companies, who are awarded with a lower COE.

Thirdly, Panel C shows that assuring the CSR reports decrease COE ( $-0.463$ ) with a significance level of 10%. Thus, we have no evidence for rejecting the third hypothesis, similarly to the findings obtained by Martinez-Ferrero and Garcia-Sanchez [50] and Weber [51]. This evidence corroborates that in emerging markets higher credibility of CSR reports also leads to a reduction in COE.

Concerning control variables, the coefficient in Return On Assets in Panel A and B is positive with a significance level of 5%, lowering to a significance level of 1% in Panel C. Therefore, the results are consistent with Li et al. [13]; Gupta [8] and El Ghouli et al. [7]. Size is always negatively related as in Panel A, B and C with a significance level of 5% as in Sharfman and Fernando [6], Dhaliwal et al. [41], Ng and Rezaee [43], and Yao and Liang [17]. This evidence indicates that firms with greater capitalization decrease their COE and are perceived as less risky investments [44,56]. The Beta's coefficient (0.074) is only significant on Panel A at the 10% level as in Ahmed et al. [11], Yao and Liang [17] and Bui et al. [18] and therefore firms' systematic risk is related with COE consistent with Sharpe [58] and Raimo et al. [44]. Lastly, Book to Market is not significant in any of the Panels.

Additionally, we implement the Hansen Test in Panel A (0.110), Panel B (0.613), and Panel C (0.128). As a consequence, we do not reject the hypotheses of over-identifying restriction and the instruments are valid. The Arellano and Bond Test shows rather similar values for Panel A (0.466), Panel B (0.307), and Panel C (0.363) and in the three panels the hypotheses of no serial correlation of errors in our model are accepted taking into account that the probability of Z value is greater than 0.05.

### 5. Conclusions

Our research analyzes the interaction of carbon emissions, environmental disclosures and assurance of CSR reports with COE using a global sample of 30 countries, with 929 firms included in the Morgan Stanley Emerging Market Index. The evidence obtained indicates that higher carbon emissions increase COE premiums which is in line with Kim et al. [12] and Bui et al. [18]. We also find that the effects of higher environmental disclosures [7,8,44] and the assurance of stand-alone reports [50,51] is opposite, in the sense that these two factors tend to lead to a lower COE. Moreover, our empirical results are robust since the Generalized Method of Moments is implemented to address endogeneity according to Blundell and Bond [52].

This study has limitations derived from the limited information of Carbon Disclosure Scores provided by the companies to the Carbon Disclosure Project database which represents an important source of carbon management data obtained through reports, surveys or other sources that are compiled and used by researchers [3,18].

This research paper provides an innovative and valuable contribution to the existing literature and also to economic agents and market participants. Firstly, it considers the relation of GHG emissions and COE in an emerging market setting whereas the majority of studies analyze the relation between carbon emissions and accounting or capital-market ratios. Secondly, our findings support the assurance of non-financial reports as a means to decrease agency costs and help create a social contract among corporate management and stakeholders. Thirdly, carbon emissions represent a risk that must be considered when capital providers analyze the situation of the firm, especially if located in countries known as the "rising power" [3] or financial information is opaque [8].



Therefore, our research suggests that companies could take advantage of voluntary carbon disclosures and try to reduce their pollutions levels to reduce their cost of capital, leading to a more sustainable planet and helping to achieve the SDG 13. Our findings also support that firms invest in better transparency strategies regarding ESG with more disclosures and external assurance are rewarded with lower equity costs. Policymakers and regulators will find our research useful to support in front of companies any new voluntary or even compulsory measure that they may decide to introduce to improve corporate environmental reporting by highlighting our findings that the cost of capital is reduced with lower emissions and better environmental disclosures. Regarding future research studies, we propose the analysis of COE, ESG and Carbon Emission disclosures from the Food and Beverage sector expanding our sample to developed and developing countries [44]. Another important context is the implementation of the Integrated Report as a sustainable practice disclosed by high Carbon Emission firms and its relation with COE; this may increase accountability especially on stakeholder-oriented countries [59]. Additionally, the quality of CSR reporting disclosed by Carbon Intensive firms and its relation with COE considering analyst coverage as a moderating variable, is in line with the Agency and Voluntary Disclosure theory as in Yao and Liang [17]. Lastly, the relation between Greenhouse Gas Emissions, non-financial quality information and female participation on the Board of Directors may represent another research avenue as in Hollindale et al. [36].

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**ANEXO 4. SUSTAINABILITY IN THE FOOD AND BEVERAGE  
SECTOR AND ITS IMPACT ON THE COST OF EQUITY**



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# Sustainability in the food and beverage sector and its impact on the cost of equity

Sustainability  
in F&B sector

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## Abstract

**Purpose** – The objective of this paper is to analyze in an international setting the relationship between environmental disclosures, carbon emissions and gender equality on the board of directors with the cost of equity (CoE) in the food and beverage sector.

**Design/methodology/approach** – The study sample includes 142 listed firms and 1,562 firm-observations from 35 developed and developing countries between 2009 and 2019. The authors implement a fixed-effects regression model to contrast the impact of the three sustainable variables of interest on the CoE.

**Findings** – The results of this study indicate that firms in the food and beverage industry benefit from a lower CoE due to better environmental disclosures and gender equality. On the other hand, carbon intensive firms are penalized with higher equity costs.

**Originality/value** – This study expands prior research on the effects of sustainable behavior on the CoE in the food and beverage industry by taking into account additional sustainability variables and a greater number of observations, both from developed and from developing countries.

**Keywords** Food and beverage, Corporate social responsibility and cost of equity, Gender equality

**Paper type** Research paper

## 1. Introduction

Nowadays, global society at large and regulators are increasingly aware of the negative effects of nonsustainable behavior on planet Earth and humankind. Several important initiatives are taking place in the international arena to help the move toward a more sustainable attitude from all economic agents, mostly from voluntary adhesion to them. Companies in the food and beverage (F&B) sector are also affected by this trend, which, as we demonstrate in this article, has a significant impact on their cost of equity (CoE). Moreover, evidence shows that the beverage sector depends heavily on natural resources, having a strong impact on the environment (Jones *et al.*, 2005; Maloni and Brown, 2006). Also, this industry is especially sensitive to social concerns such as labor rights and animal welfare (Heyder and Theuvsen, 2011), and its solid and liquid waste emissions may imply serious environmental problems if they are not appropriately managed (Guo *et al.*, 2006). Consequently, cleaner production practices help to mitigate negative environmental impacts such as the reduction of the water footprint and energy losses, especially among F&B firms with inadequate reengineering processes (Espinosa *et al.*, 2021).

Regarding environmental concerns, and more specifically climate change, the Paris Agreement aims to reduce global warming to below 2 °C above preindustrial levels, as a result of drastic reductions in green house gas (GHG) emissions in the very near future. This objective might be accomplished by discouraging the demand for fossil fuels and nonrenewable energy sources. In this sense, note that the level of energy consumption in the agro-industry chain is greater in developing than developed economies, e.g. for reference, in African countries energy consumption of the F&B chain represents 55% of the total energy consumption compared to



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only 15.7% in the USA (Clairand *et al.*, 2020). Also, carbon emissions are especially important in the food sector, as they contribute to 30% of the total global GHG (Clark *et al.*, 2020). The 2015 United Nations (UN) Sustainable Development Goals (SDG), in addition to addressing climate action in SDG 13, specifically established SDG 12 on "Responsible Consumption and Production", which focuses on the effective use of natural resources by eliminating 1.3 billion tons of food wasted in the food chain process, and suggests the material footprint (total amount of raw materials extracted to meet consumers' demand) as a metric for GDP's natural resource consumption (United Nations, 2020). Also, SDG 14 "Life below water" indicates that plastic from the F&B industry pollutes oceans, rivers and lakes (Weber and Hogberg-Saunders, 2018). Derived from the above together with the sensitiveness of this sector to SDG 5 on gender equality, this industry seems especially interesting to look at, regarding sustainable actions. In this vein, the Carbon Disclosure Project (CDP) pays attention to companies in the food chain with a specific sample of firms committed to transform raw materials into food products taking into account the value-added chain (CDP, 2020). These companies disclose information related to GHG emissions, water management, energy use, deforestation land use and food waste. Note that Corporate Social Responsibility (CSR) engagement and disclosures are most relevant for F&B firms because they have a strong impact on the environment, society and the economy (Hartmann, 2011).

While the interaction between sustainability and firms' internal operations coexists as demonstrated by the initiatives above, scholars can also help to promote this global move toward responsible action with empirical studies on the relationship of firms' sustainable profile with firms' financial position. Therefore, the purpose of this study is to analyze the relation between the CoE calculated according to Easton (2004) and three variables related to a sustainable profile: the environmental concern of the firm proxied by its environmental score, the level of GHG emissions and lastly gender diversity within the board of directors (BoD).

The relation between sustainability performance disclosed by F&B firms and market performance ratios (Omar and Zallom, 2016; Putri *et al.*, 2020) and accounting ratios has started to be studied in recent years (Coppola *et al.*, 2020; Nirino *et al.*, 2020; Weber and Saunders-Hogberg, 2020). Nevertheless, a literature gap exists because the only empirical contribution as far as we know considering the link between CSR and CoE with *ex ante* models is Raimo *et al.* (2020) with a sample from developed countries using only the environmental, social and governance (ESG) disclosure score as a proxy for sustainability. Our contribution is therefore unique and valuable, as it aims to cover this research gap by taking into account F&B listed firms from not only developed but also developing countries. Our conclusions confirm Raimo *et al.* (2020)'s finding and go a step further as three proxies are used for sustainable behavior, i.e. our study shows that CoE is reduced with better environmental behavior and gender diversity on the BoD, while the opposite holds for carbon emission intensity.

This research paper is structured as follows. After this first introductory section, Section 2 presents the literature review and theoretical framework, Section 3 explains the hypotheses development, and Section 4 presents the research methodology. Section 5 explains the results and lastly, the conclusions and recommendations section closes the paper.

### 2. Literature review and theoretical framework

The F&B industry and supply chain presents an essential service for humankind's survival and is essential for global peace (Telukdarie *et al.*, 2020). This industry has attracted scholars' attention as regards sustainability action, as we present next.

CSR practices disclosed by the F&B sector can have different motivations and implications in developed and developing countries. For instance, CSR leads F&B firms to adopt sustainable policies since this industry has to be dynamic and can be affected by deforestation and environmental or social issues (Beske *et al.*, 2014). Therefore, the food and



packaging sector is bound by social and legal norms and standards, and firms tend to be not only intrinsically but also extrinsically motivated to disclose their CSR efforts (Shnayder *et al.*, 2016). Considering Australian F&B companies and their sustainable practices, Cuganesan *et al.* (2010) conclude that high CSR performers are likely to provide disclosures which are “more symbolic” aiming to change people’s perceptions and their expectations. From a wider industry perspective, Medrado and Jackson (2016) analyze the items disclosed in CSR reports published by 14 US firms from the F&B, lodging and cruise line sectors. Their results show that lodging firms disclose more CSR activities, even though F&B sustainable disclosures outperform cruising companies by emphasizing sustainable activities such as community involvement with minorities and employees’ satisfaction feedback. In a similar context, the relation between CSR disclosures and market value measured by Tobin’s *Q* is analyzed with a sample of companies on the Amman stock market, from the F&B and two other specific sectors, showing an inverse relation between Environment and Community scores and ex-post market value (Omar and Zallom, 2016).

The study by Weber and Hogberg-Saunders (2018) on water management and consumption demonstrates that, as expected, this topic has received attention within CSR practices in the F&B sector. Regarding the improvement of energy efficiency, Bhadbhade and Patel (2020) analyze energy consumption taking into account a sample of Swiss F&B firms. Results show that energy consumption from the food sector often increases deteriorating energy efficiency rates, yet these rates can be improved by a reduction of carbon emissions following the implementation of new technology and cost-effectiveness initiatives. Similarly, Meyers *et al.* (2016) analyze the consumption of energy and carbon emissions disclosed by small and medium F&B companies from the European Union and conclude that their energy auditors recommended making energy savings toward a transition to low carbon energy sources. In this sense, the study by Lin and Xie (2016) also analyzes carbon emissions by Chinese F&B firms and provides policy advice for reducing them, putting the stress on research and development investments and clean energy sources. However, firms face financial, technical and regulatory constraints that sometimes make it difficult to adopt those measures to decrease carbon emissions and increase energy savings. In relation to the beverage sector and taking into account small and medium firms from Latvia, Kubule *et al.* (2016) analyze a sample of alcohol and nonalcohol firms and compare the energy and water consumption with its production, showing that there are many factors that explain these differences apart from production capacity. The reasonable level of sustainable behavior of five Italian firms in the food sector is evidenced according to a content analysis of their sustainability reports, yet it seems that these companies are still at an early stage of practical and coherent application (Fiandrino *et al.*, 2019). In a similar context, the analysis of sustainability disclosure methods considering family and nonfamily Italian wine firms concludes that the wine industry’s identity is based on intangible factors such as “*familiness*”, which consolidates the image and relationship between family, age and land, thus representing an important CSR driver (Iaia *et al.*, 2019).

Gender diversity is one of the sustainable profile proxies we empirically analyze in the F&B sector, which has been thoroughly looked into as different regulatory policies have been enforced in this field around the world. The function of the BoD is to monitor and mitigate the agency frictions between shareholders and firm’s management (Belaounia *et al.*, 2020). Gender diversity on the BoD has been evidenced as a driver for improvement of firm’s corporate performance because normally women come as firm’s outsiders (Du Plessis *et al.*, 2014), are less likely to be involved in financial fraud (Cumming *et al.*, 2015), are actively engaged in monitoring practices (Adams and Ferreira, 2009) and, lastly, provide new perspectives for decision-making (Daily *et al.*, 1999). Regarding gender quotas, country regulations often promote gender diversity on corporate boards (Reguera-Alvarado *et al.*, 2017). For instance, Norway back in 2008 adopted a mandatory regulation requiring that

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40% of BoD members in listed firms should be women, and several countries subsequently issued new regulations following this trend (Belaounia *et al.*, 2020). Pande and Ford (2012) conclude that women's entrance to the BoD is positive correlated with good management practices but, on the other hand, short-term profits are adversely affected. Browne (2014) argues that mandatory quotas are unfair and discriminatory because women are selected based on physical and social attributes rather than merit. Alstott (2013) argues that mandatory quotas are against the laissez-faire system because of state intervention, whereas according to Post and Byron (2013), women's participation in the BoD increases accounting returns, especially in countries with strong shareholder protection, so countries with low gender parity percentages may adopt mandatory quotas to increment women's participation and gender equality. All in all, mandatory and voluntary gender policy initiatives have brought benefits for women, such as access to academic education (Storvik, 2011) and professional opportunities (Belaounia *et al.*, 2020). Finally, the "Diffusion Mechanism" theory can explain the impact of the Norwegian experience on Spain, France, Portugal amongst different European countries (Teigen, 2012). More in line with our study, Nguyen (2020) concludes that a greater percentage of women on the BoD decreases CoE taking a sample of French-listed companies. In the same line, Srivastava *et al.* (2018), taking into consideration a mandatory policy of at least one woman on the BoD of Indian-listed firms, conclude that gender diversity marginally decreases CoE and increments return on assets (ROA). Finally, Belaounia *et al.* (2020) conclude that countries with greater gender equality promote women's participation in the BoD and thereby improve accounting-financial performance ratios, reduce capital risk expenditures and earnings management, whereas, in countries with lower gender equality (China, India, Japan amongst others), women's presence has no impact on the board's dynamics nor on firm's outcomes.

Finally, Raimo *et al.* (2020), to our knowledge, the first study on CoE and sustainability in this specific sector, conclude that CoE is negatively influenced by the ESG scores of F&B firms from developed countries. Therefore, this relationship implies that sustainable firms in this sector can benefit from additional capital resources at lower cost while decreasing information asymmetries between their stakeholders. Our study expands Raimo *et al.* (2020) with a larger sample which also includes developing countries and more proxies for sustainable behavior – i.e. environmental scores, carbon emissions and gender diversity on the BoD – covering therefore a higher range of topics covered by the SDG.

Regarding the theoretical framework for our study, several theories can be mentioned, as Garzón-Jiménez and Zorio-Grima (2020) point out in their literature review on sustainability and CoE. For instance, the Agency theory explains the adverse relation between capital providers and firm's management structure since the latter may have private undisclosed information, and voluntary disclosure of financial and nonfinancial information helps to solve the stewardship problem reducing the principal's monitoring costs (Healy and Palepu, 2001). Also, the Stakeholder theory considers that one crucial role of private firms is to create bonds with different stakeholders by investing and disclosing ESG activities, thereby legitimizing the entity, also in accordance with the Legitimacy theory.

### 3. Hypotheses development

Most empirical studies between CoE and sustainability have been focused on developed countries taking into account environmental scores (Sharfman and Fernando, 2008) or CSR indexes as those calculated for US-listed firms in Dhaliwal *et al.* (2011) and El Ghoul *et al.* (2011). Ahmed *et al.* (2019) analyze the corporate social and environmental practices from UK-listed firms and find that they have a negative impact on CoE. Moreover, considering research with international multisector samples, several studies confirm that the relation remains inversely related. For instance, according to Breuer *et al.* (2018), CSR disclosures have a negative effect on

CoE, which seems even more intense in countries where investor protection is strong. Gupta (2018) also demonstrates that environmental disclosures decrease CoE, especially in stakeholder-oriented countries or when companies move to those countries from low-social-capital states. El Gboul *et al.* (2018) conclude that corporate environmental disclosures have a negative effect on CoE as firms have greater commitments with stakeholders and thus increase their legitimacy. Also, Garzon-Jimenez and Zorio-Grima (2021b) show that CoE has a negative relation with environmental scores taking into account their findings from a sample including emerging market listed firms. Finally, Raimo *et al.* (2020) specifically find that ESG scores decrease CoE of F&B firms. Therefore, we post our first hypothesis:

*H1.* Higher sustainable profile measured through the environmental score has a negative impact on firm's CoE.

Kim *et al.* (2015) analyze the relation between the voluntary disclosure of carbon intensity of firms and CoE considering a sample of Korean-listed firms. Their results indicate that carbon intensity has a positive relation with CoE, therefore penalizing investors, no matter if the companies voluntarily disclose a CSR report or not. Indeed, Bui *et al.* (2020) show that carbon intensive firms are penalized by higher equity expenses, but the positive relation may be mitigated by a higher level of disclosures in the Carbon Disclosure Project (CDP) especially in common-law countries and better governed countries. Garzon-Jimenez and Zorio-Grima (2021b), taking into account a sample of firms from the Morgan-Stanley Emerging Market Index, demonstrate that carbon intensive firms have higher CoE, but this relation is mitigated with other type of proxies such as environmental scores and CSR assured reports. Different proxies can be used to analyze corporate action regarding carbon emissions. For instance, in addition to the carbon intensity or carbon disclosures already looked into by the studies mentioned, Albarrak *et al.* (2019) use *ICarbon* proxies provided by social networks as a method to disseminate carbon disclosures from US-listed firms.

Therefore, we present our second hypothesis:

*H2.* Carbon emissions intensity has a positive impact on firm's CoE.

The BoD is a valuable mechanism to deal with procedures and decision-making process to manage firms in favor of the stakeholders' interests (García Lara *et al.*, 2017). Prior research has proven that gender diversity on the BoD may reduce information asymmetries and that a higher percentage of women inside the BoD reduces share's volatility by implementing new skills and quality decision-making inside the organization (Jizi and Nehme, 2017). In this sense, with a sample of Spanish-listed firms, Abad *et al.* (2017) demonstrate that a higher percentage of women in the BoD increases the quality and the quantity of the information disclosed to capital providers, thus decreasing information asymmetries and stock return volatility. Furthermore, Hossain and Kryzanowski (2020) show that gender diversity decreases CoE, especially when firms are strongly monitored and affected by financial constraints. Finally, Nguyen (2020), with a sample of French-listed firms, concludes that women's participation in the BoD is negatively associated with CoE because of their greater monitoring activities, which increases shareholders' confidence. Based on the abovementioned, we posit the third and final hypothesis:

*H3.* Gender diversity on the BoD has a negative impact on firm's CoE.

#### 4. Research methodology

Data from companies were obtained from the Thomson Reuter Eikon monitor database. The criteria for selecting the sample include the GICS sector (Food Products and Beverages) and an average company market value not lower than 9.5 billion US dollars. For CoE calculations,

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we gathered the information from the Thomson Reuters I-B-E-S (International Broker Estimates) database. Our sample includes 142 listed firms from the F&B sector and 1,562 firm-year observations from 2009 to 2019. Table 1 describes the number of observations by countries and number of firms.

The CoE represents the investor's rate of return in the long term by sacrificing liquidity in the short term (Garzón-Jiménez and Zorio-Grima, 2020) or the percentage return expected by investors for holding equities rather than risk-free financial instruments (Michaels and Grüning, 2017). Therefore, to calculate CoE, we implement Easton (2004) Modified Price Earning Growth Model with zero dividend payments, expected earnings per share (EPS) for year  $t + 2$  and year  $t + 1$  divided by the share price of each individual firm  $i$  and in year  $t$  which is the time when the EPS are forecasted. This model has already been implemented in Reverte (2012), Martínez-Ferrero and García-Sánchez (2017), Michaels and Grüning (2017), Zhou *et al.* (2017), Raimo *et al.* (2020) and Garzón Jiménez and Zorio-Grima (2021a)

	Number of firms	Observations	Percentages
Australia	8	88	6
Belgium	1	11	1
Brazil	2	22	1
Canada	2	22	1
Chile	1	11	1
China	17	187	12
Denmark	2	22	1
France	4	44	3
Germany	2	22	1
Hong Kong	4	44	3
India	2	22	1
Indonesia	4	44	3
Republic of Ireland	3	33	2
Israel	2	22	1
Italy	1	11	1
Japan	13	143	9
Malaysia	9	99	6
Mexico	4	44	3
The Netherlands	3	33	2
New Zealand	1	11	1
Norway	10	110	7
Philippines	1	11	1
Poland	1	11	1
Russia	1	11	1
Saudi Arabia	2	22	1
Singapore	5	55	4
South Africa	2	22	1
Spain	1	11	1
Sweden	2	22	1
Switzerland	4	44	3
Taiwan	1	11	1
Thailand	2	22	1
Turkey	1	11	1
United Kingdom	7	77	5
USA	17	187	12
TOTAL	142	1562	100

**Table 1.**  
Sample distribution by country

$$CoE_{it} = \sqrt{\frac{EPS_{(i,t+2)} - EPS_{(i,t+1)}}{P_{it}}} \quad (1) \quad \text{Sustainability in F\&B sector}$$

Table 2 explains the control and sustainable variables in our regression model.

In order to test the relation between CoE and the control and sustainable variables, we implement a fixed-effect panel data model according to the Hausman test, which analyzes the relation or absence of correlation between the independent variables with the error term (Hausman, 1978). In our study, the  $p$ -value of the Hausman test is lower than the 0.05 probability benchmark (0.0262), and therefore, we implement a fixed-effects model as in Faysal *et al.* (2020) and Raimo *et al.* (2020). Also, we lag the environmental score similar to Elsayed and Paton (2005), Horváthová (2012) and El Ghouli *et al.* (2018).

Model:

$$CoE_{it} = \beta_1 Environmental\ Score_{(i,t-1)} + \beta_2 GHGEmissions_{it} + \beta_3 BoD\ Gender\ Diversity_{it} + \beta_4 MKTCAP_{it} + \beta_5 BETA_{it} + \beta_6 ROE_{it} + \varepsilon_{it} \quad (2)$$

Sustainability in the F&B sector may consider different aspects such as promoting green energy sources, animal handling, pollution, waste resource reduction and demand of natural resources (Maloni and Brown, 2006). In this sense, drivers for environmental management system implementation can be identified, such as knowledge of ISO-14001, tax benefits as evidenced by Salim *et al.* (2018) with a sample of Malaysian F&B firms. Extant research has evidenced the positive impacts on firm's financial performance of sustainable behavior in this sector. For instance, water management has a positive impact on firm's financial performance (Weber and Saunders-Hogberg, 2020) with a sample of US F&B firms. Similarly, but considering a sample of polluting-sector firms, environmental scores increment firm's profitability (Clarkson *et al.*, 2011). Consequently, sustainable behavior may help to mitigate negative externalities from the excessive demand of energy and water resources, and therefore, we predict a negative sign on the environmental score and CoE in line with Sharfman and Fernando (2008), Gupta (2018), El Ghouli *et al.* (2018), Ahmed *et al.* (2019), Garzón-Jiménez and Zorio-Grima (2021b). The gender diversity variable measures the percentage of women on the BoD. Srivastava *et al.* (2018) state that gender diversity on Indian BoD decreases their CoE and increases ROA. Belaounia *et al.* (2020) evidence that gender equality and female diversity on the BoD enhance profitability. Thereby, we expect a negative result for the gender diversity coefficient (Abad *et al.*, 2017; Nguyen, 2020).

Variable	Description
Cost of equity (CoE)	Calculated according to Easton (2004) price earnings growth model – continuous variable
Environmental score	Capitalizes best management practices according to firm's impact on living and nonliving natural systems value between 0% and 100% – continuous variable
Green house gas (GHG) emissions	Natural logarithm of total carbon emissions (Scope 1 and Scope 2) – continuous variable
Gender diversity on BoD	Proportion of women part of the board of directors – continuous variable
Market capitalization	Natural logarithm of firm's market capitalization – continuous variable
Beta	Firm's systematic risk – continuous variable
Return on equity (ROE)	Measures firm's profitability – net earnings scaled by total equity – continuous variable

Table 2. Variable description

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Contrary, we expect a positive sign on the GHG emissions variable as carbon-intensive listed firms can be expected to be penalized by the market and have higher CoE. Note F&B firms intensively demand energy, so quantifying their carbon footprint is important to generate awareness and help diminish their GHG emissions by, for instance, implementing energy-efficient activities such as producing biodegradable food packaging materials, reengineering transportation logistic processes and, on the other side, promoting sustainable diet consumption patterns (Kumar and Chakabarti, 2019). Regarding the control variables, we consider the firm size proxied by the natural logarithm of the market capitalization as in Dhaliwal *et al.* (2014) and Li and Liu (2018). Beta measures firm's systematic risk as in Breuer *et al.* (2018), Garzón Jiménez and Zorio-Grima (2021b). Finally, return on equity (ROE) is a measure of the profitability for the shareholders used for instance by Richardson and Welker (2001), so following extant research, we expect a negative coefficient.

### 5. Results

Table 3 shows the descriptive statistics for the variables used in our study. The mean for the variables CoE, environmental score, GHG emissions, gender diversity on the BoD, market capitalization, BETA and ROE is, respectively: 11.32%, 28.29%, 13.29, 9.13%, 8.28, 0.43 and 14.5%.

Table 4 presents the Pearson correlation matrix showing some significant relations between COE and different control and sustainable variables. There is no evidence of multicollinearity among variables which is confirmed with the variance of inflation factor (VIF) of 1.45, well below the benchmark level of 10 (Raimo *et al.*, 2020; Shad *et al.*, 2020).

Table 5 shows the results of our regression model taking into account the sustainable and control variables with the objective of contrasting the three hypotheses explained above.

First, our results show that the relation between the environmental score is negatively related to CoE (-0.0430) with a significance level of 10%. Consequently, regarding our first hypothesis, our result is consistent with Gupta (2018), Ahmed *et al.* (2019) and Raimo *et al.* (2020). The significance of this relation in sustainable firms may create a new paradigm since global competition demands high-quality and ecologically friendly products. In this sense, the beverage sector seems to be making important efforts to implement safe and bio-friendly activities, processes and products, thus being considered as an increasingly green industry (Guo *et al.*, 2006). In fact, implementing cleaner production techniques improves waste management, decreases the loss of raw materials and promotes good environmental practices (Espinosa *et al.*, 2021). Similarly, agency costs diminish in the F&B sector with ESG disclosures which are related to product safety, good quality of F&B products amongst other practices required to solve world hunger (Raimo *et al.*, 2020). Thus, our findings indicate that

**Table 3.**  
Descriptive statistics:  
mean, standard  
deviation, quartiles for  
the dependent and  
independent variables

Variable	Mean	Std. dev.	Max.	Min.	25th percentile	50th percentile
CoE	0.1132671	0.111621	1.639649	0	0.0561839	0.094492
Environmental score	0.2829884	0.3033814	0.9803562	0	0	0.194376
GHG emissions	13.29224	1.764431	16.76957	6.099197	12.19996	13.33638
Gender diversity on BoD	0.0913925	0.1295837	0.625	0	0	0
Market capitalization	8.282634	1.342069	12.68148	3.155986	7.387656	8.380703
BETA	0.4343719	0.4789146	2.625236	-0.376392	0	0.3366565
ROE	0.1457292	0.1642613	1.327355	-1.201596	0.0629321	0.1242996

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	1	2	3	4	5	6	7
COE	1						
MKTCAP	-0.1663***	1					
BETA	-0.0887***	0.2162***	1				
ROE	-0.2156***	0.1078***	-0.0866***	1			
Environmental score	-0.022	0.5358***	0.1421***	-0.0806***	1		
GHG emissions	0.0475	0.5559***	0.1495***	-0.056	0.1376***	1	
Gender diversity on BoD	0.0531**	0.2446***	0.1422***	-0.0334	0.5836***	-0.1316***	1

**Note(s):** Coefficients with asterisks are statistically significant: \*\*\*1% \*\*5% \*10%. The Variance of Inflation Factor shows that there is no multicollinearity among variables

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**Table 4.** Pearson correlation coefficients

	Coefficient	Robust standard error	p-value
Environmental score	-0.0438889*	0.0243361	0.072
GHG emissions	0.0119061**	0.0056406	0.035
Gender diversity on BoD	-0.0963163*	0.053512	0.073
Market capitalization	-0.0135891	0.0092365	0.142
BETA	-0.0437754***	0.0094272	0
ROE	-0.0883236**	0.0435047	0.043
Hausman test p-value	0.0262		
R <sup>2</sup> (within)	0.0988		
Observations	1562		
Prob. > F	0.0000		

**Note(s):** Significance level at \*\*\*1% \*\*5% \*10%

**Table 5.** Regression analysis with fixed-effects panel data model

F&B firms adopting a sustainable behavior benefit from lower CoE and at the same time help achieve the 2030 SDG, preserving humankind's survival by protecting and preserving natural resources.

Second, the relation between GHG emissions and CoE is positively related (0.0119) with a significance level of 5%, confirming that the market penalizes polluting firms with higher equity expenses which is in line with [Kim et al. \(2015\)](#), [Bui et al. \(2020\)](#), [Garzon-Jiménez and Zorio-Grima, \(2021b\)](#), which confirms our second hypothesis. Indeed, GHG emissions may be reduced by adopting agroecological practices, carbon taxation and implementing effective farm management techniques such as the reduction of nitrogen fertilizers often used for increasing the crop yield ([Clark et al., 2020](#)).

Third, the percentage of women in the BoD has a negative influence on COE (-0.0963) with a significance level of 10%. Therefore, regarding our third hypothesis, our result is consistent with [Hossain and Kryzanowski \(2020\)](#), [Srivastava et al. \(2018\)](#) and [Nguyen \(2020\)](#). In fact, existing research has proven that a greater female presence in the BoD increases profitability ratios and reduces capital risk expenditures in countries with greater gender diversity ([Belaounia et al., 2020](#)).

Finally, regarding the control variables, ROE has a negative relation with CoE with a significance level of 5%, so we can conclude that greater profitability diminishes CoE. The market capitalization is not significant, whereas the beta coefficient is negative and significant at the 1% level, similarly to [Athanasakou et al \(2020\)](#).

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### 6. Conclusions and recommendations

The contribution of this paper is especially valuable as it provides evidence that can help increase the inertia to make F&B companies more sensitive to sustainability issues and help toward the achievement of the SDG. This industry represents an important sector regarding carbon emissions and is key to humankind's survival.

According to our results, if companies in this sector improve their sustainable behavior, they may gain benefits in the form of lower costs of capital, probably derived from increased legitimacy among their different stakeholders and lower agency costs, which is an interesting theoretical implication. In fact, our results also have practical implications, as our findings indicate that better environmental scores (El Ghouli *et al.*, 2018; Gupta, 2018) and higher presence of females in the BoD (Abad *et al.*, 2017; Nguyen, 2020) are relevant factors that reduce CoE. Also, higher levels of GHG emissions increase CoE (Bui *et al.*, 2020; Garzón-Jiménez and Zorio-Grima, 2021b) with the implicit negative effects on the financial management of the company. Our results are especially interesting and incremental to recent contributions in this industry sector, as we take into account additional sustainable variables and a greater number of countries and firm-year observations.

In this sense, our research provides new insights of interest for companies and state regulators. Managers might find this reduction in CoE a good reason to invest in sustainable initiatives and cleaner production strategies as maybe this type of actions might attract capital sources more sensitive to sustainability, such as socially responsible investment funds (Reverte, 2012; Gupta, 2018). These funds may invest in sustainable F&B listed firms both in developed and developing markets settings. State regulators may also introduce voluntary or even compulsory standards, certifications or taxes related to the environment, so firms are more prone to improve their environmental disclosures, for example, regarding energy and water management (Meyers *et al.*, 2016; Bhadbhade and Patel, 2020) or the reduction of carbon emissions by implementing new technology (Lin and Xie, 2016). Regarding gender diversity, increasing female participation in the BoD of F&B listed firms may reduce their financial risk, increasing profitability and more importantly decrease information asymmetries and CoE (Abad *et al.*, 2017; Nguyen, 2020). This trend can be promoted through the introduction of mandatory gender quotas or even nonmandatory ones yet promoted by the Codes of Good Governance (Belaounia *et al.*, 2020; Srivastava *et al.*, 2018). Nevertheless, mandatory gender quotas by themselves seem to be somehow controversial, especially in emerging market economies, since gender inequality may motivate firms to implement the practice of "tokenism" (Du Plessis *et al.*, 2014; Srivastava *et al.*, 2018) with women having minimal participation in the BoD not really accomplishing the SDG 5 "Gender Equality". Our contribution may help the F&B sector to accomplish the SDG 12 "Responsible Consumption and Production" which would imply improving firm's sustainability toward reducing CoE. Finally, implementing clean production practices (Espinosa *et al.*, 2021) and proper environmental resource management (Weber and Saunders-Hogberg, 2020) may definitely improve the value-added and reduce waste of food and resources, which is in line with SDG 12.

Our research has some limitations, such as unbalanced panel data. Also, the number of firms that had information in I-B-E-S to calculate CoE was rather limited, which had an effect on the sample size. Furthermore, note that our data came from the Thomson Reuters Eikon database, which may not be consistent compared to Bloomberg or other monitors (Freiberg *et al.*, 2020). Moreover, our results indicate that greater gender diversity in the BoD has a negative impact on CoE, yet without controlling for other types of sociocultural factors or equality variables in our study.

Finally, as future avenues of research, new studies can expand our findings by analyzing the relation between CSR assurance, cleaner production practices and audits (Espinosa *et al.*, 2021; Rahim and Raman, 2015), water management footprint (Weber and Saunders-Hogberg, 2020), CSR activities (Nguyen *et al.*, 2020) and their impact not only on CoE but also on



cost of debt or other proxies on financial impact such as accounting ratios or capital markets variables (Sierra-García *et al.*, 2014; Martínez-Ferrero and García-Sánchez, 2017).

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