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ESSAYS ON THE SPANISH REIT MARKET

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A mi padre

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Introducción y Resumen de la Tesis Doctoral

Los *Real Estate Investment Trust* (REIT), equivalentes a la figura española de las Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario (SOCIMI), son instrumentos de inversión colectiva cuyo propósito es la tenencia directa o indirecta de activos inmobiliarios para el alquiler. Se trata de un instrumento de inversión que permite invertir en carteras formadas con distintos inmuebles, con una profesionalización en la gestión y escalabilidad y que presentan una clara ventaja en términos de diversificación del riesgo frente a la inversión directa.[1] En el desarrollo de la presente Tesis Doctoral se ha analizado tres aspectos relacionados con las SOCIMI incorporadas al Mercado Alternativo Bursátil (MAB), mercado español que aglutina el mayor número de este tipo de vehículos de inversión: la determinación de si se produce infravaloración en el momento de la salida a bolsa, el análisis de rendimientos anormales tras la salida al mercado y el análisis del impacto de la pandemia del COVID-19 durante la primera ola. Concretamente, estos tres aspectos se abordan en tres estudios, que constituyen el cuerpo central de la presente Tesis.

Varias son las motivaciones que nos han impulsado a analizar las SOCIMI en nuestro país. Por una parte, la reciente aparición y fulgurante crecimiento de esta figura en España. Como veremos con más detalle a continuación, la primera SOCIMI se incorporó al mercado bursátil a finales de 2013 y desde ese momento se ha producido un rápido crecimiento, tanto en número como en tamaño de estas sociedades. Se trata, por tanto, de un mercado emergente, muy poco estudiado hasta el momento por falta de muestra suficiente para realizar un análisis empírico fiable. No obstante, la importancia del sector inmobiliario en la estructura económica de España, el fuerte interés en este sector por parte de los inversores internacionales, el relevante peso de las SOCIMI españolas en el entorno europeo que sitúan a España como uno de los referentes de estos vehículos de inversión y el incremento en el número de salidas a bolsa de estas empresas

[1] Dentro de los REIT es posible distinguir varias categorías, a saber: los *Equity REIT*, régimen asimilable a las SOCIMI; los *Mortage REIT*, centrados en la adquisición de carteras hipotecarias, así como la titulización, cuyos ingresos derivan del pago periódico de intereses por parte de los prestatarios; y los *Hybrid REIT* que comparten las características de las dos categorías anteriores, invirtiendo tanto en inmuebles como en préstamos hipotecarios o valores respaldados por hipotecas (López-Penabad y Vázquez, 2020).

han sido algunas de las razones que nos han impulsado a analizar el mercado de las SOCIMI en España, hasta el momento casi inexplorado.

El abultado número de salidas a Bolsa de las SOCIMI en los últimos años, así como el característico modo en que se incorporan al MAB (salida directa o *listing),* nos ha conducido a analizar dos cuestiones que han sido documentadas en diferentes mercados de valores internacionales tanto para las SOCIMI como para empresas ajenas a este sector: la infravaloración en el momento de la salida a bolsa y el análisis de rendimientos anormales tras la salida al mercado.[2]

Existe un importante cuerpo de literatura académica sobre la existencia de infravaloración y el bajo rendimiento a largo plazo después de la salida a bolsa. Sin embargo, la mayor parte de la misma versa sobre el análisis de estos fenómenos cuando las compañías comienzan a cotizar en el mercado bursátil tras ofertas públicas iniciales (OPI). No obstante, como veremos más adelante, dentro de los requisitos de incorporación al mercado objeto de análisis no existe la obligación de realizar una OPI siempre que, con carácter previo a la incorporación, se cuente con el requisito de capital flotante mínimo descrito más adelante en la Tabla 2, siendo en estos casos el precio de inicio de negociación determinado por el Consejo de Administración de la SOCIMI en función de la valoración de la sociedad realizada por un experto independiente y no el precio de la emisión de las acciones (o precio al que se colocan/venden las acciones) como sucede en las OPI. En este sentido, la totalidad de las SOCIMI del mercado analizado realizaron una salida directa o *listing* sin colocación de valores u OPI, cuestión que nos hizo plantearnos si con esta premisa se produciría un aumento del precio de las acciones en los primeros momentos de cotización. Una vez constatada la existencia de rendimientos iniciales anormales positivos estadísticamente significativos, nuestro interés se centra en determinar si las teorías existentes en la literatura al respecto explican este fenómeno o si viene explicado por otros elementos propios del mercado o de las empresas participantes. Por ello, nuestro segundo objetivo es indagar sobre los motivos por los que surge la infravaloración en las salidas de las SOCIMI al MAB. Así,

[2] Resulta relevante mencionar que, históricamente, los *Real Estate Investment Trust* (REIT) han sido analizados de manera separada del resto de compañías por las características específicas de estos vehículos de inversión, características que se mencionan más adelante (Stevenson, 2013). La naturaleza de los REIT, así como las restricciones normativas a las que están sujetos, los hacen mucho más transparentes que otras empresas (Below et al., 1995; Ling y Ryngaert, 1997; Wang et al., 1992; Wong y Ong, 2013). Esta transparencia hace que sea relativamente fácil para los inversores valorar este tipo de empresas. Por tanto, los REIT pueden considerarse un caso de estudio aparte.

planteamos un conjunto de hipótesis y seleccionamos una serie de *proxies* que entendemos son las más pertinentes teniendo en cuenta las teorías existentes en la literatura que se encuadran en el marco de la búsqueda de nuevos inversores y/o capital con la salida a bolsa, las características del mercado y de los vehículos de inversión que acceden al mismo.

Tras el análisis del rendimiento de los primeros momentos de cotización, nuestro propósito es analizar el comportamiento bursátil tras la salida al mercado. Existe una abundante literatura académica sobre la existencia de rendimientos anormales negativos durante amplios periodos de tiempo tras la salida a bolsa de una empresa. Sin embargo, también hay pruebas de que este fenómeno no se produce en el caso de las empresas que eligen la cotización directa. El hecho de que la totalidad de las incorporaciones al mercado de las SOCIMI objeto de análisis se han producido de manera directa o *listing* y bajo la visión clásica de la incorporación rápida y completa de la información pública por parte de los mercados, podríamos esperar que no se produjese un rendimiento anormal negativo tras la salida de las SOCIMI al mercado. Sin embargo, la evidencia nos muestra que los precios se ajustan lentamente, sugiriendo, por tanto, que los mercados podrían no ser eficientes. Esta cuestión, unida a que una de las características del mercado de SOCIMI analizado es su la escasa liquidez que, entre otras cuestiones, dificulta la entrada de inversores institucionales, nos lleva a plantearnos si realmente existirán rendimientos anormales tras la salida al mercado. Dado que nuestros resultados muestran la existencia de un rendimiento anormal tras la salida al MAB de las SOCIMI en España, hemos seleccionado una serie de variables y planteado unas hipótesis a contrastar sobre las características de la empresa y el mercado y el modo en que salen a bolsa que pueden estar relacionadas con estos cambios anormales en el precio de las acciones tras el *listing*. Estas variables e hipótesis han sido seleccionadas en el contexto de las diferentes teorías existentes sobre la rentabilidad post-incorporación y están diseñadas para cubrir las características específicas de este tipo de vehículos de inversión y las peculiaridades del mercado donde cotizan.

Si bien nuestro interés en el desarrollo de la presente Tesis ha ido dirigido hacia temas relacionados con la valoración y fijación del precio de salida a bolsa de las SOCIMI analizadas, la aparición de la pandemia por COVID-19 y las ulteriores medidas impuestas para la contención del virus en los diferentes países que provocaron una paralización de

la actividad económica y financiera a nivel global y crisis mundial, abrieron nuevas oportunidades de investigación sobre el impacto de la misma en diferentes ámbitos, incluido el económico-financiero. En España, el Gobierno decretó el primer Estado de Alarma el 14 de marzo de 2020, tres días después de que la Organización Mundial de la Salud (OMS) declarase la COVID-19 como pandemia, e impuso fuertes restricciones a la movilidad dentro del ámbito nacional. Estas medidas han tenido efectos distintos en los diferentes sectores de actividad, siendo el de las SOCIMI posiblemente uno de los más afectados ya que: i) la paralización de la actividad económica ha provocado el aumento del desempleo y el incremento de los Expedientes de Regulación Temporal de Empleo (ERTE), conllevando al retraso o incluso el impago de los alquileres por parte de algunos inquilinos, ii) el cierre forzoso de los centros comerciales y los establecimientos minoristas ha aumentado el nivel de morosidad en el pago de las rentas por parte de estos usuarios, iii) la implantación generalizada del teletrabajo en España ha provocado un descenso en la demanda y el uso de las oficinas y (iv) las fuertes restricciones a la movilidad, que limitan la libre circulación de las personas, han provocado un fuerte descenso del turismo y de la demanda de alojamiento turístico y hotelero. Dado que, como hemos señalado, se trata de un sector afectado por las consecuencias económicas de la pandemia, consideramos relevante analizar el impacto de esta crisis sobre estos vehículos de inversión, cuestión que ya había sido estudiada en otros mercados internacionales pero no en el español.

Una vez expuestas nuestra principales motivaciones para la realización de la presente Tesis Doctoral, creemos conveniente realizar una breve introducción sobre el sector de las SOCIMI y del mercado analizado.

Los REIT nacieron en Estados Unidos de América en la década de los 60 del siglo XX y desde aquel momento han registrado una importante expansión internacional. En Europa, el establecimiento de un marco legal para adoptar esta figura se ha producido de manera paulatina como consecuencia de las modificaciones normativas realizadas por los diferentes países en el sector de la inversión inmobiliaria. Sin embargo, esta figura tardó en prosperar porque coincidió, en muchos casos, con la época de la crisis financiera global en la que los REIT no despertaron el interés de la comunidad inversora. No obstante, en los últimos años en Europa se ha producido un fuerte crecimiento tanto en el número como en la capitalización de los mismos. La Tabla 1 del primer ensayo (*Essay* I*)* muestra

la composición del mercado de REIT en el mundo con anterioridad a la crisis sanitaria provocada por la pandemia de COVID-19. En ella se observa como Europa, a cierre del ejercicio 2019, representa el 26% en cuanto a número de REIT respecto al mercado global y casi un 12% en términos de capitalización.

En España, las SOCIMI fueron introducidas mediante la Ley 11/2009, de 26 de octubre (Reino de España, 2009) con el objeto de dinamizar el mercado inmobiliario, impulsar el mercado del alquiler, proporcionar liquidez a las inversiones inmobiliarias y facilitar el acceso a la propiedad inmobiliaria a nuevos actores. Sin embargo, los rígidos requisitos legales y su régimen fiscal, más restrictivos que el de los REIT de su entorno, junto con un escenario macroeconómico e inmobiliario adverso tras la crisis financiera, hicieron que esta figura no fuera atractiva por lo que la primera SOCIMI en España no llegó hasta finales del año 2013, fruto, entre otras cuestiones, de la modificación de dicha ley en el año 2012. La Ley 16/2012 (Reino de España, 2012) introdujo una mayor flexibilidad, condiciones menos restrictivas y ventajas fiscales para este tipo de sociedades, equiparando su régimen legal y fiscal al de los REIT de otros países, lo que propició la aparición de estos vehículos de inversión en el mercado español. En la Tabla 1 se muestra una relación de las principales modificaciones introducidas con la nueva Ley 26/2012.

Así, una vez acometida la revisión del régimen jurídico y fiscal, los principales pero no únicos aspectos que regula las SOCIMI en la Ley 26/2012, de 27 de diciembre, además de los ya expuestos en la Tabla 1, son los siguientes:

a) Son sociedades anónimas cuyo objeto social principal debe comprender las siguientes actividades: (i) adquisición y promoción de bienes inmuebles de naturaleza urbana para su arrendamiento, incluyendo la rehabilitación de edificaciones, (ii) tenencia de participación en otras SOCIMI o REIT no residentes, (iii) participación en SOCIMI no cotizadas o en sociedades no residentes no cotizadas, siempre que su objeto social sea la adquisición de inmuebles urbanos para su arrendamiento, tengan una política similar de distribución de beneficios y estén íntegramente participadas por SOCIMI o por REIT no residentes, (iv) inversión en acciones o participaciones de Instituciones de Inversión Colectiva Inmobiliaria.

Tabla 1. Modificaciones del régimen de SOCIMI regulado por la Ley 11/2009 introducidas con la Ley 26/2012.

	Ley 11/2009, de 26 de octubre	Ley 26/2012, de 27 de diciembre
Capital social mínimo	15 millones de euros.	5 millones de euros.
Número mínimo de inmuebles	Tres.	Uno.
Permanencia mínima de las inversiones inmobiliarias	Siete años.	Tres años.
Endeudamiento	Financiación ajena no superior al 70% del activo.	No existe límite al endeudamiento.
Distribución de resultados mínimo	90% sobre alquileres y otras rentas accesorias. 50% sobre transmisión de inmuebles y participaciones en el capital . 100% sobre dividendos procedentes de participaciones en capital.	80% sobre alquileres y otras rentas accesorias. 50% sobre transmisión de inmuebles y participaciones en el capital 100% sobre dividendos procedentes de participaciones en capital.
Fiscalidad	Tributación al 18% de los beneficios en el impuesto de sociedades. Exención equivalente al 20% de los ingresos por arrendamiento de viviendas (cuando la inversión en viviendas supera el 50% del activo).	Tributación al 0% de los beneficios en el impuesto de sociedades. Tributación al 19% de los pagos de dividendos a los accionistas con participación igual o superior al 5% y exentos para accionistas con un tipo de gravamen inferior al 10%. [(a)]
Requisito de cotización	Cotización en mercados regulados de la UE o del EEE.	Cotización en mercados regulados y sistemas multilaterales de negociación de la UE, del EEE o de países con los que exista un intercambio efectivo de información tributaria.

Fuente: Reino de España (2009, 2012).

[(a)] La entidad estará sometida a un gravamen especial del 15 por ciento sobre el importe de los beneficios obtenidos en el ejercicio que no sea objeto de distribución, en la parte que proceda de rentas que no hayan tributado al tipo general de gravamen del Impuesto sobre Sociedades ni se trate de rentas acogidas al período de reinversión. Modificación introducida por la Ley 11/2021, de 9 de julio, de medidas de prevención y lucha contra el fraude fiscal, con efectos para los periodos impositivos que se inicien a partir del 1 de enero de 2021 (Reino de España, 2021).

b) Solo podrán tener una clase de acciones que tendrán carácter nominativo.

c) Se permite un desfase de dos años entre la constitución de la SOCIMI y su admisión a negociación en un mercado regulado o sistema multilateral de negociación.

d) Una vez hayan optado por la aplicación del régimen fiscal especial, deberán incluir en su denominación la indicación de "Sociedad Anónima Cotizada de Inversión en el Mercado Inmobiliario, Sociedad Anónima" o "SOCIMI, S.A".

e) Respecto de los requisitos de inversión, las SOCIMI deberán tener invertido al menos el 80 por ciento del valor de sus activos en: (i) inmuebles de naturaleza urbana destinados al arrendamiento, (ii) terrenos para la promoción de dichos inmuebles siempre que la promoción se inicie dentro de los tres años siguientes a su adquisición, (iii) participaciones en el capital o en el patrimonio de las sociedades mencionadas en el apartado a) anterior.

f) Junto a la actividad económica derivada del objeto social principal, las SOCIMI podrán desarrollar otras actividades accesorias, entendiéndose como tales aquellas actividades cuyas rentas en conjunto representen menos del 20 por ciento de las rentas de la sociedad en cada período impositivo.

g) Asimismo, en relación con el volumen de rentas se exige a las SOCIMI que al menos el 80 por ciento de las rentas de cada ejercicio procedan de: (i) arrendamiento de inmuebles afectos a su objeto social principal; y/o (ii) dividendos o participaciones en beneficios procedentes de participaciones afectas al cumplimiento del objeto social principal. Se excluyen del cómputo las rentas derivadas de la transmisión de participaciones que cualifiquen como inversión apta y de inmuebles, siempre que se hayan respetado los períodos mínimos de mantenimiento.

h) En materia de obligaciones de información, deberán, entre otras obligaciones informativas, crear un apartado en la memoria de las cuentas anuales que incluya determinada información sobre los aspectos y parámetros necesarios para poder aplicar el régimen fiscal especial.

i) Bonificación del 95 por ciento en la modalidad de Transmisiones Patrimoniales Onerosas del ITPAJD en la adquisición de viviendas destinadas al arrendamiento y de

terrenos para la promoción de viviendas destinadas al arrendamiento, condicionada al cumplimiento del requisito de mantenimiento del activo.

La mencionada reforma de la Ley de SOCIMI, junto con la recuperación económica y la mejora del sector inmobiliario español, hizo que desde la incorporación de la primera SOCIMI en diciembre de 2013, el número y tamaño de estas sociedades haya crecido exponencialmente en los últimos años, a excepción del ejercicio 2020, fruto de la crisis sanitaria por la pandemia del COVID-19 (véase el Gráfico 1).

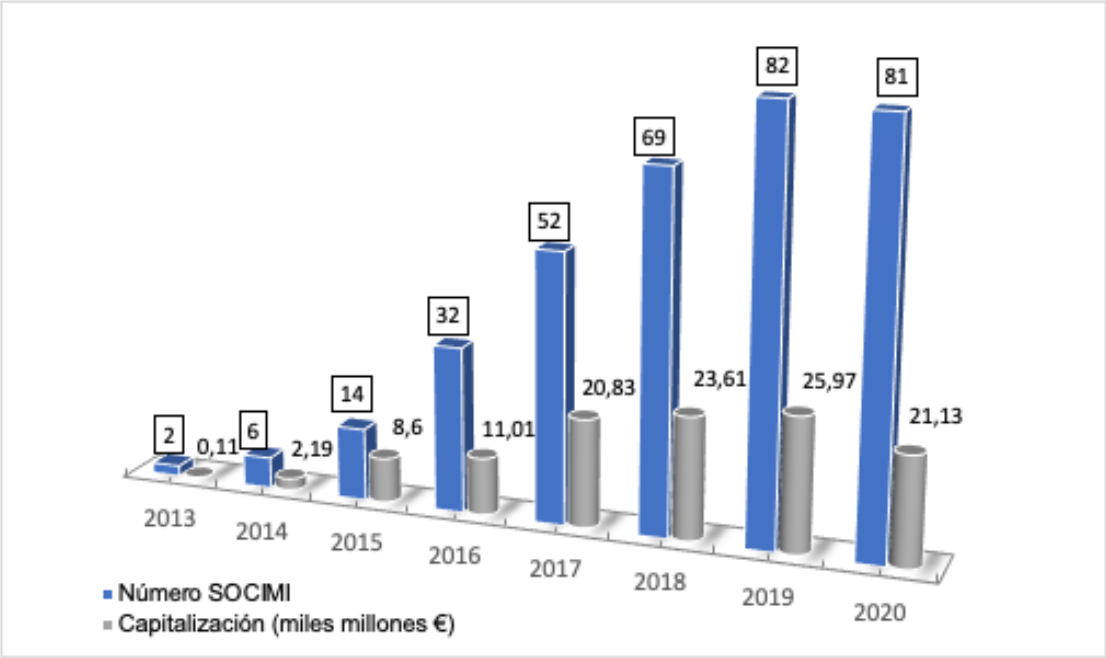

Gráfico 1. Evolución de las SOCIMI en la bolsa española durante el periodo 2013-2020.

Fuente: Elaboración propia a partir de Jones Lang LaSalle y Bolsas y Mercados Españoles (2021).

Este rápido crecimiento en los últimos años, ha permitido situar a España como uno de los países referentes de este vehículo de inversión en Europa. Así, tal y como se muestra en la Tabla 2 del primer ensayo (*Essay* I), si tomamos los datos a cierre de 2019, periodo previo a la crisis sanitaria, los REIT españoles ocupaban el tercer puesto en Europa (incluido Reino Unido) en cuanto a capitalización de mercado, con un 11,76%, únicamente superado por Reino Unido (37,26%) y Francia (26,86%) y el primer puesto respecto del número de REIT.

Históricamente la actividad inmobiliaria en la economía española ha sido relevante. El peso de las actividades inmobiliarias sobre el total del PIB en España durante el periodo analizado ha alcanzado alrededor del 10% desde el lado de la oferta (según datos del Instituto Nacional de Estadística español). Asimismo, la inversión en el sector inmobiliario en España en el ejercicio 2019 sobrepasó los 12.000 millones de euros (excluyendo las operaciones corporativas), cifra similar a la de 2018 y superando la media de los seis años anteriores. Si desglosamos dicha cantidad, la inversión extranjera directa representó el 61% y 60% del volumen total de inversión en este sector en 2018 y 2019, respectivamente. Los REIT invirtieron cerca de 5.000 millones de euros, el 25% del total, en 2018 y el 9% del total en 2019. El resto se correspondió con la inversión nacional (CBRE, 2019, 2020). Estos datos nos muestran el creciente atractivo de este sector para los inversores internacionales. En este sentido, cabe destacar la presencia de los inversores extranjeros en la bolsa española con una participación del 80% en el efectivo negociado de las bolsas españolas y un 48% de propiedad de las empresas españolas cotizadas a cierre de 2018 (Bolsas y Mercados Españoles, 2018f, 2019b) siendo esta última cifra del 50,2% al cierre del ejercicio 2019 (Bolsas y Mercados Españoles, 2020a).

En cuanto a las salidas a bolsa se refiere, en los años 2017, 2018 y 2019 el sector inmobiliario representó el 76%, 79% y 77% del número de salidas a bolsa en el mercado español, respectivamente. Si únicamente tenemos en cuenta las incorporaciones de las SOCIMI, estos datos se sitúan en el 68%, 75% y 77%, respectivamente.[3]

Como ya hemos comentado anteriormente, la modificación de la legislación de las SOCIMI en España en el año 2012 flexibilizó algunos de los requisitos para estos vehículos con el objeto de potenciar un régimen que había resultado totalmente inoperativo hasta ese momento. La Ley 16/2012 introdujo la posibilidad de que las SOCIMI pudieran cotizar en un Sistema Multilateral de Negociación (SMN), *Multilateral Trade Facilities* (MTF) en inglés, y no únicamente en un mercado regulado.[4] Como consecuencia, en febrero de 2013 se creó un segmento específico dedicado a las SOCIMI en el Mercado Alternativo Bursátil (MAB), el Sistema Multilateral de Negociación español. En este sentido, de las 81 SOCIMI existentes en el mercado español a 30 de junio

[3] Información obtenida de la página web de Bolsas y Mercados Españoles, sección de estadísticas https://www.bolsasymercados.es/esp/Estudios-Publicaciones/Estadisticas

[4] Los Sistemas Multilaterales de Negociación se encuentran regulados en el Capítulo I del título X del Real Decreto Legislativo 4/2015, de 23 de octubre, por el que se aprueba el texto refundido de la Ley del Mercado de Valores, en adelante, Ley del Mercado de Valores (Reino de España, 2015b).

de 2020 (fecha en la que finalizan nuestros análisis), 77 se encontraban incorporadas en el MAB frente a las 4 admitidas en el mercado regulado español, más ampliamente conocido como Mercado Continuo, SIBE o Bolsa de Valores.[5] Puesto que el MAB, al no tratarse de un mercado regulado, presenta una regulación más flexible en cuanto a requisitos de incorporación y contratación que el Mercado Continuo, no se ha incluido en nuestro análisis las 4 SOCIMI (5 en algunos periodos del horizonte de estudio) del Mercado Continuo para que el análisis sea homogéneo y los resultados no se vean distorsionados por las diferentes características y regulación de este mercado y el MAB. Por ello, el marco general de la presente Tesis Doctoral lo constituye el segmento del Mercado Alternativo Bursátil especialmente diseñado para la negociación de acciones de SOCIMI: MAB-SOCIMI.

Consideramos conveniente señalar que, en octubre de 2020 el Mercado Alternativo Bursátil pasó a denominarse BME MTF Equity, coincidiendo con el reconocimiento por parte de la Comisión Nacional del Mercado de Valores (CNMV) de la categoría europea de SME Growth Market, en España denominado Mercado de Pyme en Expansión.[6] Así, las SOCIMI que cotizaban en el segmento MAB-SOCIMI pasaron al nuevo segmento denominado BME Growth. No obstante, a lo largo de la presente Tesis Doctoral hemos mantenido la denominación original y la explicación de las características del MAB-SOCIMI por ser la vigente durante el periodo analizado.

El Mercado Alternativo Bursátil, perteneciente a Bolsas y Mercados Españoles, Sistemas de Negociación S.A. (BMESN), sociedad del Grupo Bolsas y Mercados Españoles (BME), se creó en 2006 para dar cabida, en un primer momento, a la negociación de un tipo específico de valor, las Sociedades de Inversión de Capital Variable (SICAV). Posteriormente, con el paso de los años, se ha ido creando diferentes segmentos con una regulación y procesos adaptados específicamente a las características de cada valor o instrumento financiero. Así, en 2007 se constituye un nuevo segmento dedicado a las Entidades de Capital Riesgo. En 2009, se crea el segmento de empresas en expansión (MAB-EE), con el objetivo de facilitar el acceso al mercado de capitales a empresas de reducida capitalización que presentasen necesidades de financiación. Un

[5] A 30 de junio de 2020 había 10 SOCIMI españolas cotizando en el SMN Euronext Access.

[6] Esta categoría se desarrolló en el marco de la iniciativa de la Unión de Mercado de Capitales y está recogida en la Directiva 2014/65/UE del Parlamento Europeo y del Consejo de 15 de mayo de 2014, relativa a los mercados de instrumentos financieros, más conocida como MIFID II (Parlamento Europeo, 2014).

poco más tarde, en 2010 arranca un segmento dedicado a las Instituciones de Inversión Colectiva (IIC) de inversión libre y en 2013 el ya mencionado segmento específico dedicado a las SOCIMI (MAB-SOCIMI). Finalmente, en 2017 se constituye uno nuevo para fondos de inversión, aunque no ha tenido actividad desde su constitución.

El MAB está sujeto a la supervisión de la CNMV. Sin embargo, al tratarse de un SMN, aunque manteniendo elevados niveles de transparencia, presenta una regulación más flexible en cuanto a requisitos de admisión a negociación, mantenimiento y transparencia que el Mercado Continuo, puesto que no le son de aplicación las normas dirigidas a los mercados regulados ni la normativa aplicable a las sociedades cotizadas tal y como éstas están definidas en la Ley del Mercado de Valores. Se trata, por tanto, de un mercado autorregulado con un Reglamento y Circulares e Instrucciones Operativas propias. Como SMN, tiene la obligación de contar con un Reglamento de funcionamiento de carácter público que debe regirse por criterios transparentes, objetivos y no discriminatorios y debe ser autorizado por la CNMV e inscrito en el correspondiente registro de dicha entidad.[7] Asimismo, la Sociedad de Gestión de los Sistemas de Registro, Compensación y Liquidación de Valores (Iberclear) es la entidad encargada del registro contable de los valores admitidos a negociación en el MAB, así como de la liquidación de las operaciones realizadas en dicho mercado.[8]

Una vez definido el marco general donde se inscribe el MAB-SOCIMI, en la Tabla 2, Tabla 3 y Tabla 4 se presentan los principales requisitos de incorporación, permanencia e información y características de la contratación de las SOCIMI en el MAB, respectivamente, indicando las modificaciones más relevantes producidas desde la creación del segmento.[9]

[7] Artículo 320 del Real Decreto Legislativo 4/2015, de 23 de octubre, por el que se aprueba el texto refundido de la Ley del Mercado de Valores (Reino de España, 2015b).
[8] En el caso de las SOCIMI, según Circular de Iberclear 1/2013, de 20 de marzo (Iberclear, 2013).
[9] A fecha de cierre de la presente Tesis Doctoral, y tras la transformación del MAB en BME MTF Equity, y el segmento de SOCIMI, junto con el de Empresas en Expansión en el segmento de negociación BME Growth, la regulación expuesta en las Tablas 2, 3 y 4 fue modificada, siendo la vigente, además del Reglamento de funcionamiento de BME MTF Equity y algunas circulares que no se mencionan en dicha tabla, la Circular 1/2020, de 30 de julio, sobre requisitos y procedimiento aplicables a la incorporación y exclusión en el segmento de negociación BME Growth de BME MTF Equity (Bolsas y Mercados Españoles, 2020b), la Circular 3/2020, de 30 de julio, sobre información a suministrar por empresas incorporadas a negociación en el segmento BME Growth de BME MTF Equity (Bolsas y Mercados Españoles, 2020c), la Circular 4/2020, de 30 de julio, sobre Asesor Registrado en el segmento de negociación BME Growth de BME MTF Equity (Bolsas y Mercados Españoles, 2020d) y la Circular 5/2020, de 30 de julio, sobre normas de contratación de acciones de sociedades incorporadas al segmento

Cabe destacar una serie de cuestiones particulares del mercado por su especial relevancia en los estudios realizados en la presente Tesis Doctoral. Por una parte, la exigencia de dos figuras en este mercado, a saber: el Asesor Registrado y el Proveedor de Liquidez. Los Asesores Registrados, profesionales especializados que actúan como interlocutores entre las entidades emisoras y el mercado, tienen como funciones principales la valoración de la idoneidad de las sociedades para su incorporación, el asesoramiento en el cumplimiento de sus obligaciones y responsabilidades por su participación en el MAB y participar en la elaboración y presentación de la información, tanto financiera como de cualquier índole, requerida por el mercado (Bolsas y Mercados Españoles, 2016e).[10]

En cuanto al Proveedor de Liquidez, el objeto de los contratos de liquidez es favorecer la liquidez de las transacciones, conseguir una frecuencia de contratación suficiente y reducir las variaciones en el precio cuya causa no sea la propia tendencia del mercado. Para ello, el Proveedor de Liquidez está obligado a introducir diariamente órdenes de compra y venta por un importe efectivo total mínimo y con una horquilla de precios máxima marcada por el mercado (Bolsas y Mercados Españoles, 2016a, 2017c).

Por otra parte, respecto a la negociación, ésta se realiza de manera multilateral y electrónicamente en el SIBE-SMART (mismo sistema electrónico que el utilizado en el Mercado Continuo) mediante la contratación de valores con fijación de precios únicos para cada periodo de subasta (*fixing*). Los valores permanecen en subasta durante toda la sesión (de 8.30 a 16.00 horas) con dos momentos de fijación de precio y asignación de títulos, a las 12 y 16 horas. El precio resultante de la segunda subasta es el precio de cierre de la sesión siempre que se negocien al menos 200 títulos en ésta. En caso contrario, el precio de cierre será, de entre los precios correspondientes a las 200 últimas unidades de contratación negociadas, el que resulte más cercano a su precio medio ponderado y, en caso de que los dos precios guarden la misma diferencia con ese precio ponderado, el último de los negociados. Si no se negociasen durante la sesión 200 títulos, el precio de cierre será el de la sesión anterior.

BME Growth de BME MTF Equity (Bolsas y Mercados Españoles, 2020e) todas ellas aplicables desde el 1 de octubre de 2020.

[10] La Ley 5/2015, de 27 de abril, de Fomento de la Financiación Empresarial, previó que en la normativa de los sistemas multilaterales de negociación que incluyan la figura del Asesor Registrado, estos deberán velar porque los emisores cumplan correctamente, desde la perspectiva formal como sustantiva, con sus obligaciones de información frente a la sociedad rectora y los inversores (Reino de España, 2015a).

Tabla 2. Principales requisitos de incorporación de las SOCIMI al MAB durante el periodo analizado. [(a)] [(b)]

Capital social mínimo	No existe un mínimo.
Colocación previa	Posibilidad de realizar Oferta Pública de Venta (OPV), Oferta Pública de Suscripción (OPS), colocación privada o no realizar colocación (*listing*).
Capital flotante mínimo *(Free Float*)	Los accionistas con participación inferior al 5% deben ser titulares, como mínimo, de un número de acciones que se corresponda con (i) un valor estimado de mercado de 2 millones de euros o (ii) el 25% de las acciones emitidas. En el cómputo anterior se incluirán las acciones puestas a disposición del proveedor de liquidez para realizar esa función. [(c)]
Información inicial	Folleto registrado en la CNMV o Documento Informativo de Incorporación al Mercado (DIIM) con información detallada de la compañía y, en su caso, de la operación a realizar. Información financiera histórica: 3 últimos ejercicios auditados. [(d)] Si no cuentan con 24 meses consecutivos auditados, es obligatorio realizar previsiones del ejercicio en curso y siguiente aprobadas por el Consejo de Administración.
Compromiso de no venta *(Lock-up)*	Los accionistas con más de un 5% de capital, administradores y principales directivos, deben comprometerse a no vender acciones en el año siguiente a la incorporación al MAB, salvo aquellas que se pongan a disposición del Proveedor de Liquidez u otras que sean objeto de una oferta de venta, tenga o no consideración de oferta pública. [(e)]
Agentes especialistas	Obligación de designar a un Asesor Registrado y suscribir un contrato con un Proveedor de Liquidez.
Fijación precio de referencia	Obligación de aportar una valoración realizada por un experto independiente de acuerdo con criterios internacionalmente aceptados, salvo que dentro de los seis meses previos a la solicitud se haya realizado una colocación de acciones o una operación financiera que resulten relevantes para determinar un primer precio de referencia para el inicio de la contratación.

[(a)] **Legislación que lo regula**: Circular 2/2013, de 15 de febrero (Bolsas y Mercados Españoles, 2013); Circular 1/2014, de 20 de enero (Bolsas y Mercados Españoles, 2014a); Circular 2/2014, de 24 de enero (Bolsas y Mercados Españoles, 2014b); Circular 6/2016, de 5 febrero (Bolsas y Mercados Españoles, 2016g); Circular 13/2016, de 26 de julio (Bolsas y Mercados Españoles, 2016b), Circular 14/2016, de 26 de julio (Bolsas y Mercados Españoles, 2016c); Circular 20/2016, de 5 de diciembre (Bolsas y Mercados Españoles, 2016f); Circular 1/2017, de 11 de abril (Bolsas y Mercados Españoles, 2017a); Circular 6/2017, de 20 de diciembre (Bolsas y Mercados Españoles, 2017b); Circular 9/2017, de 21 de diciembre (Bolsas y Mercados Españoles, 2017d); Circular 1/2018, de 24 de julio (Bolsas y Mercados Españoles, 2018a); Circular 2/2018, de 24 de julio (Bolsas y Mercados Españoles, 2018b); Circular 1/2019, de 29 de octubre (Bolsas y Mercados Españoles, 2019a)

[(b)] La Circular 20/2016, de 5 de diciembre, crea un sub-segmento específico denominado "SOCIMI en Desarrollo" para aquellas SOCIMI o sociedades extranjeras equiparables de nueva incorporación que

cuenten con menos del 70% del valor de mercado de su activo invertido, directa o indirectamente, en bienes inmuebles de naturaleza urbana destinados al arrendamiento.
(c) Desde el 9 de marzo de 2016, momento en que entró en vigor la Circular 6/2016, de 5 de febrero, se incluye una nueva exigencia, ya que las acciones puestas a disposición del Proveedor de Liquidez para el cómputo de difusión deberán difundirse en el plazo máximo de un año desde su incorporación. Para las SOCIMI incorporadas en ese momento, el cómputo del año comenzó a contar desde dicha fecha. Finalmente, desde el 1 de agosto de 2017, se suprime la posibilidad de computar las acciones puestas a disposición del Proveedor de Liquidez para la difusión inicial (Circular 1/2017, de 11 de abril).
(d) Desde el 1 de noviembre de 2019 (Circular 1/2019, de 29 de octubre) pasa a ser de 2 ejercicios en lugar de 3. Asimismo, desde el 1 de enero de 2018, mediante la Circular 6/2017, de 20 de diciembre, se incluye una mención a que el último año de información financiera auditada no puede preceder en más de 15 meses (pasa a ser de 18 meses desde el 1 de noviembre de 2019 según la Circular 1/2019, de 29 de octubre) a la fecha de solicitud de incorporación y, si dicha fecha es posterior en más de nueve meses al fin del último ejercicio auditado, deberá incorporarse información financiera intermedia sometida a revisión limitada a una fecha no superior a cuatro meses (pasa a ser de seis meses desde el 1 de noviembre de 2019 según la Circular 1/2019, de 29 de octubre) respecto de la fecha de solicitud de incorporación.
(e) Se incluye a los administradores desde el 1 de agosto de 2016 (Circular 13/2016, de 26 de julio). Asimismo, la última excepción de la oferta se incorporó con la Circular 1/2018, de 24 de julio, con efectos desde el 1 de agosto de 2018.

Tabla 3. Principales requisitos de permanencia e información de las SOCIMI en el MAB durante el periodo analizado. (a)

Información financiera	*Periodicidad:* Semestral. *Remisión al Mercado:* dentro de los cuatro meses siguientes al final del primer semestre o del cierre contable de cada ejercicio.(b) *Estándar:* - Sociedades del Espacio Económico Europeo pueden optar por NIIF o estándar contable nacional. - Sociedades de países no miembro: NIIF o US GAAP.(c) *Revisión auditores exigible*: Auditoría completa para información financiera anual y revisión limitada para la información semestral.(d)
Estructura organizativa y sistema de control interno	Deberán aportar, en el mismo momento que la información financiera anual pero de manera separada a la misma, información sobre la estructura organizativa y el sistema de control interno con los que cuente la sociedad para el cumplimiento de las obligaciones de información que establece el Mercado.(e)
Grado de cumplimiento previsiones	De manera semestral, junto con la publicación de la información financiera, deberán informar sobre el grado de cumplimiento de las previsiones siempre que cuenten con las mismas.
Informe de valoración de activos	Exigible anualmente con independencia del estándar contable elegido. Deberá hacerse pública dentro del mismo plazo que la información financiera anual así como estar realizada por un experto independiente, con identificación del mismo y del método utilizado para dicha valoración.

Tabla 3. cont.

Participaciones significativas	Obligación de comunicar al mercado con carácter semestral la relación de accionistas con posición igual o superior al 5% del capital social. En el caso de los administradores y directivos, esa obligación se refiere al 1%.
Reglamento de Abuso de Mercado	Aplicación completa bajo la supervisión de CNMV. Publicación de información relevante (información privilegiada desde mayo de 2020) y otra de interés para los emisores.
Operaciones realizadas por administradores y directivos	Obligación de comunicar, con carácter inmediato, todas las operaciones que realicen sus administradores y directivos sobre acciones de la sociedad en cuya virtud alcancen, superen o desciendan de un 1% del capital o cualquier múltiplo.
Pactos parasociales	Deberán comunicar de inmediato la suscripción, prórroga o extinción de aquellos pactos parasociales que restrinjan la transmisibilidad de las acciones o que afecten al derecho de voto de los accionistas.
Gobierno Corporativo	No es necesario informe anual de Gobierno Corporativo ni Comisión de Auditoría[(f)]
Página web	Deberán contar con todos los documentos públicos que se hayan aportado al Mercado para su incorporación, así como toda la información remitida al Mercado con posterioridad.

[(a)] **Legislación que lo regula**: Circular 2/2013, de 15 de febrero (Bolsas y Mercados Españoles, 2013); Circular 7/2016, de 5 de febrero (Bolsas y Mercados Españoles, 2016h); Circular 13/2016, de 26 de julio (Bolsas y Mercados Españoles, 2016b), Circular 15/2016, de 26 de julio (Bolsas y Mercados Españoles, 2016d); Circular 5/2018, de 24 de julio (Bolsas y Mercados Españoles, 2018c); Circular 6/2018, de 24 de julio (Bolsas y Mercados Españoles, 2018d).

[(b)] El plazo de remisión de la información semestral era de tres meses. Pasó a ser de cuatro meses por primera vez respecto de la información financiera correspondiente al primer semestre de 2016 (Circular 7/2016, de 5 de febrero).

[(c)] No se permite remitir balance y estado de cambios en el patrimonio abreviados ni cuenta de pérdidas y ganancias abreviada a partir de la información financiera correspondiente a los ejercicios que comenzaron a partir del día 1 de enero de 2016 (Circular 13/2016, de 26 de julio).

[(d)] La obligación relativa a la revisión limitada de las cuentas semestrales se exigió por primera vez respecto de la información financiera correspondiente al primer semestre de 2016 (Circular 7/2016, de 5 de febrero).

[(e)] Exigido por primera vez respecto de la información financiera correspondiente al primer semestre de 2016 (Circular 7/2016, de 5 de febrero).

[(f)] Desde el 5 de agosto de 2016, es obligatorio contar con un Reglamento Interno de Conducta (Circular 6/2016, de 5 de febrero).

Tabla 4. Principales características de la contratación de las SOCIMI en el MAB durante el periodo analizado. [(a)]

Tipo de negociación	Electrónica, a través del SIBE-SMART.
Sistema de contratación	*Fixing* (negociación multilateral) y bloques y operaciones especiales (negociación bilateral).

[(a)] **Legislación que lo regula** Circular 2/2013, de 15 de febrero (Bolsas y Mercados Españoles, 2013); Circular 13/2016, de 26 de julio (Bolsas y Mercados Españoles, 2016b), Circular 7/2017, de 20 de diciembre (Bolsas y Mercados Españoles, 2017c); Circular 8/2018, de 19 de septiembre (Bolsas y Mercados Españoles, 2018e).

También es posible negociar las acciones de estas sociedades en el SIBE-SMART a través de la contratación de bloques. Esta modalidad de negociación bilateral permite a los miembros ejecutar operaciones previamente negociadas al margen del libro de órdenes, cuyo volumen cumpla unos requisitos de tamaño y precio (este último requisito de precio vigente hasta el 3 de enero de 2018). Los precios resultantes de esta modalidad de contratación no se consideran oficiales. Asimismo, existe otra modalidad de contratación bilateral cuyo precio no se considera oficial: las operaciones especiales. Éstas se realizan al cierre del mercado y deben o (i) cumplir unas condiciones de precio y tamaño mínimo o (ii) ser autorizadas por la Comisión de Supervisión del mercado (Bolsas y Mercados Españoles, 2017c, 2018e).

Finalmente, dentro de los requisitos de incorporación, no existe una obligatoriedad de realizar una oferta pública inicial de valores (OPI) siempre que, con carácter previo a la incorporación se cuente con el requisito de capital flotante mínimo descrito en la Tabla 2. En este sentido, la totalidad de las SOCIMI de este Mercado durante el periodo analizado se han incorporado a través de un *listing* (sin OPI) por lo que el precio tomado como precio inicial para la incorporación (precio de referencia) no proviene de una colocación en oferta pública, sino que viene determinado por el Consejo de Administración de la SOCIMI en función de la valoración de la sociedad realizada por un experto independiente. No obstante, la normativa permite que, en el caso de que con carácter previo a la incorporación a negociación las SOCIMI hubieran realizado una colocación privada de acciones o una operación financiera que resulte relevante, se tome como precio de referencia para el inicio de la contratación de las acciones de la sociedad en el mercado el precio de la mencionada colocación u operación financiera (Bolsas y Mercados Españoles, 2018b).

Estructura de la Tesis Doctoral

La presente Tesis se estructura en tres ensayos. Estos tres ensayos se corresponden con tres artículos científicos que o bien han sido ya publicados (*Essay* II) o están siendo revisados (*Essays* I y III) en revistas de reconocido prestigio internacional. Por ello, algunos de los conceptos y datos ya comentados en la Introducción y Resumen de la Tesis Doctoral se encuentran explicados y recogidos en cada uno de los ensayos con el objeto de que cada artículo científico esté convenientemente contextualizado. La Tesis finaliza con un apartado de discusión y conclusiones dedicado a exponer las líneas generales de las principales conclusiones obtenidas en los ensayos anteriormente expuestos y la discusión de las mismas, las principales limitaciones con las que nos hemos encontrado en la realización de la presente Tesis y las futuras líneas de investigación que consideramos podrían acometerse.

El primer ensayo (*Essay* I) está dedicado a determinar si se produce infravaloración de las SOCIMI en el momento de la incorporación al segmento SOCIMI del MAB. A pesar de que existe una amplia literatura sobre la existencia de este fenómeno en otros mercados internacionales tanto de REIT como de otro tipo de compañías, dado el tipo de salida a bolsa de manera directa o *listing* no esperábamos encontrar infravaloración. Sin embargo, los resultados muestran que este fenómeno tiene lugar a pesar del modo en que las SOCIMI se incorporan al mercado y que es el primer momento de la negociación el que aglutina la mayor parte de la rentabilidad inicial anormal. En un segundo análisis se aborda la infravaloración inicial segmentando la muestra entre las SOCIMI que han realizado colocación privada previa y las que no puesto que el modo en que se fija el precio de referencia difiere en ambos casos, con el objeto de determinar si este hecho influye en el nivel de infravaloración. Asimismo, se analiza el rendimiento compuesto de los días posteriores a la salida para comprobar si el ajuste en el precio continúa en las siguientes jornadas. Dada la evidencia encontrada sobre la existencia de un aumento anormal de los precios en los primeros días de cotización, el último de nuestros propósitos en este primer ensayo es realizar un estudio sobre los factores explicativos de esta infravaloración. Para ello, contrastamos una serie de hipótesis

basadas en diferentes teorías de la literatura e incluimos otras que recogen algunas de las características específicas de estos vehículos de inversión y del propio mercado.

Una vez analizado el rendimiento de los primeros días de cotización y detectada infravaloración en el primer ensayo, nos planteamos la posible existencia de un ajuste lento de precios dadas algunas características específicas de este mercado, entre las que cabe destacar su reducida liquidez. Por ello, en el segundo ensayo (*Essay* II) se acomete el análisis del comportamiento bursátil de las SOCIMI tras la salida al mercado para las ventanas de 6, 12 y 24 meses posteriores a la incorporación, a través de distintas metodologías empleadas comúnmente en la literatura y utilizando una amplia gama de controles o referencias en la estimación de las rentabilidades anormales. Puesto que obtenemos pruebas de que los emisores experimentan rendimientos anormales negativos, económica y estadísticamente significativos durante los dos años posteriores al inicio de su cotización, para finalizar este segundo ensayo, planteamos una serie de hipótesis y seleccionamos un conjunto de variables sobre las características de la empresa, el modo en que cada una de ellas se incorpora a bolsa y el propio mercado, que podrían explicar el comportamiento bursátil de los precios tras la salida al MAB.

Dado el gran impacto económico que ha tenido la inesperada pandemia del COVID-19 y su distinto impacto en los diferentes sectores de actividad, el tercer ensayo (*Essay* III) está dedicado al estudio de cómo ha afectado la misma a las SOCIMI del MAB durante la primera ola (primer semestre de 2020), tanto desde un punto de vista bursátil como de la *performance* operativa. Las medidas impuestas por el gobierno español para mitigar la transmisión de la pandemia han afectado directamente a las actividades relacionadas con el negocio de las SOCIMI, siendo este un sector muy afectado por las consecuencias económicas de la misma. Así, en primer lugar estudiamos el impacto en el MAB-SOCIMI de manera global a través del índice de dicho segmento (creado *ad-hoc*) mediante la comparación de la evolución de dicho indicador con el resto de índices españoles y con los índices de REIT a nivel mundial y analizando su comportamiento alrededor de las fechas claves del COVID-19 en España y en cuatro periodos comprendidos entre dichas fechas. En segundo lugar, analizamos la relación entre algunas características de las SOCIMI y su comportamiento bursátil, centrándonos especialmente en nuestras variables objeto de estudio: la incidencia del COVID-19 según la localización geográfica de los activos y el tipo de propiedad en el que invierten. Con el objeto de

analizar el impacto en la situación económico-financiera de las propias SOCIMI, calculamos diferentes ratios de rentabilidad, eficiencia, apalancamiento y valoración durante dos periodos pre-COVID y uno COVID y comprobamos si se produce un cambio significativo entre la *performance* operativa en el semestre inducido por la pandemia respecto al periodo sin COVID-19. Por último, analizamos este cambio según las variables objeto de nuestro estudio, el tipo de propiedad y la incidencia del COVID-19 en función de la ubicación de los activos.

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Essay I

The Underpricing of Spanish REITs When Going Public

1. INTRODUCTION

The increase in the price of the shares at the initial time of listing, or underpricing, is one of the topics that has most interested researchers in recent decades. In the case of Real Estate Investment Trusts (REIT) this phenomenon has been investigated separately from the other companies, as the specific characteristics of these investment vehicles entail less uncertainty in their valuation (Hartzell et al., 2005).[1] As we discuss in the third section, from 1992 to date numerous studies conducted in different markets have found a positive and significant increase in the price of REIT shares on the first day of trading.

This study analyses the existence of underpricing of REITs when they were listed on the Spanish stock market during the period November 2013 to January 2019 and investigates the underlying explanatory factors. The sample comprises all the admissions carried out on the Spanish Alternative Stock Market (Mercado Alternativo Bursátil – MAB).[2,3] One of the differentiating characteristics of this market with respect to those previously studied is that the flotations were not carried out through an Initial Public Offering (IPO) but through a direct listing. However, some REITs have opted for a private placement of shares prior to market entry (up to 6 months before), which has allowed us to split the sample into two segments according to whether the REITs analysed performed a private placement prior to market entry or not.

The raw initial-day return obtained is significant with a mean value of 1.58% (1.44% and 1.41% when adjusted for the Madrid Stock Exchange General Index (IGBM) and the FTSE EPRA/NAREIT Spain, respectively). We break down the first trading day underpricing into the primary and secondary markets (Gokkaya et al., 2015; Ling et al., 2020) and find a significant underpricing of 1.37% and 0.27%, respectively. This mean initial-day underpricing is maintained if we split the sample between the REITs that performed previous private placement (2.21%) and those that did not (1.31%) and

[1] Some differential characteristics of REITs are that they invest in tangible assets which can be rented so as to generate income, they have specific organisational structures and shareholder limitations and they are required to distribute dividends, among others. See Stevenson (2013) for a detailed discussion.

[2] The MAB has been selected because it is the Spanish stock market on which the highest number of REITs are listed. The five REITs of the Spanish *Mercado Continuo* (which is a regulated market) have not been included in the sample so that the results are not distorted by differences in the characteristics and regulation of this market and the MAB.

[3] In October 2020 this market was renamed BME MTF Equity and Spanish REITs have been listed since then in the so-called BME Growth segment of BME MTF Equity. Nevertheless, we have kept the original name as it was the one in force during the period under analysis

although it is greater in the first case, the difference between the two is only significant at 10% using the bootstrap methodology. However, although we have found that the main price adjustment occurs at the initial moment of trading (first fixing), it continues until the third day. Thus, the buy-and-hold return for that period is 2.58% (2.63% and 2.45% when adjusted for IGBM and FTSE EPRA/NAREIT Spain, respectively).

Likewise, by testing a series of hypotheses based on different theories reported in the literature, we have obtained empirical evidence that the pre-listing stock market conditions, the proportion of shares held by executive positions (signalling theory) and the fact that the members of the board of directors of the REIT fix the reference price for the beginning of trading based on the equilibrium price determined by the appraiser (differentiating feature of the MAB) all have a significant relationship with the level of underpricing. However, we have obtained no evidence that the ex-ante uncertainty about the value of the company is related to the underpricing level.

The importance of the real estate sector in the economic structure of Spain, the strong interest in this sector on the part of international investors, the significant weight of Spanish REITs in Europe and the increase in the number of stock market flotations of these companies are some of the main reasons that have led us to analyse underpricing in REITs that go public in Spain.

This paper makes several contributions to the literature. Firstly, as far as we know, this is the first study to analyse the underpricing of REITs in Spain when going public on an individual basis,[4] which allows it to be compared with that of other widely studied markets. The recent incorporation of this type of institution into Spanish legislation has so far not allowed us to have a sufficiently large sample of REITs on which to carry out empirical studies individually. Secondly, underpricing is analysed by breaking it down into primary and secondary market returns, which has only been studied in this way in the REITs of the US market (Gokkaya et al., 2015; Ling et al., 2020) . Finally, it is the first research to analyse the phenomenon of underpricing in REITs during a complete post global financial crisis period (2014-2018), a crisis that began in the real estate sector, which is relevant for the Spanish market, and later extended to the financial sector.

[4] The Spanish market has been included in the analysis of multi-country underpricing studies but in a very residual manner, as shown in Section 3.

The rest of the paper is organised as follows. Section 2 describes the arrival of REITs in Spain and the characteristics of the market in which they are listed. Section 3 examines the empirical evidence on the underpricing of REITs. The theoretical framework and hypotheses are described in section 4. Sections 5 and 6 describe the sample and the methodology used, respectively. The results obtained are shown in section 7. Section 8 concludes.

2. THE DEVELOPMENT OF THE REIT MARKET IN SPAIN

REITs first appeared in the United States in the 1960s and some years later, in 1971, this vehicle reached Australia. The development of REITs in Asia, Canada and Europe has taken place over the last two decades and continues to do so in various countries classified as "nascent", such as Costa Rica, Bulgaria, Oman, Philippines, Pakistan or India (Ernst & Young, 2018). Table 1 shows the composition of the REIT market around the world at the end of 2019 (EPRA, 2020).

Table 1. REIT markets around the world.

Country/region	Number of REITs	No. REITs/ Total No. REITs (%)	Capitalisation (million USD)	Capitalisation/ Total capitalisation (%)
America	269	31.43	1,353.46	66.24
United States	*189*	22.08	*1,266.67*	*61.81*
Asia - Pacific	271	31.66	412.8	20.20
Australia	*45*	5.26	*100.31*	*5.21*
EMEA	316	36.92	276.95	13.55
Europe [(a)]	*226*	26.40	*244.09*	*11.95*
MEA [(b)]	*90*	10.51	*32.86*	*1.61*
Total Global Markets	856	100.00	2,043.21	100.00

Notes:
Figures at 31 December 2019.
[(a)] Includes Europe Union and Russian Federation.
[(b)] Includes Israel, South Africa, Turkey and United Arab Emirates.
Source:
Own elaboration based on EPRA (2020).

In Europe, the establishment of REITs occurred as a result of regulatory changes introduced by different countries in the real estate investment industry. Although the process of becoming established gradually advanced [France, 2003; Germany, 2007;

United Kingdom, 2007; Italy, 2007; Finland, 2009; Spain, 2009; Ireland, 2013; and Belgium, 2014; among others (EPRA, 2018)], it took time to prosper because in many cases it coincided with the global financial crisis. As a consequence, REITs did not arouse the interest of the investment community. However, in the last five years there has been a strong growth in Europe in terms of both number and capitalisation.

In Spain, REITs were introduced by means of Spanish Law 11/2009 (Reino de España, 2009) in order to stimulate the Spanish real estate market and provide real estate investments with liquidity. However, the restrictions imposed on these companies in that legislation made this figure unattractive and the first REITs did not reach Spain until the end of 2013, as a result of the amendment of said law in 2012. Law 16/2012 (Reino de España, 2012) introduced greater flexibility, less restrictive conditions and certain tax advantages for this type of company, which led to the creation of these investment vehicles in Spain.[5] The number and size of these companies has grown exponentially in recent years (see Figure 1).

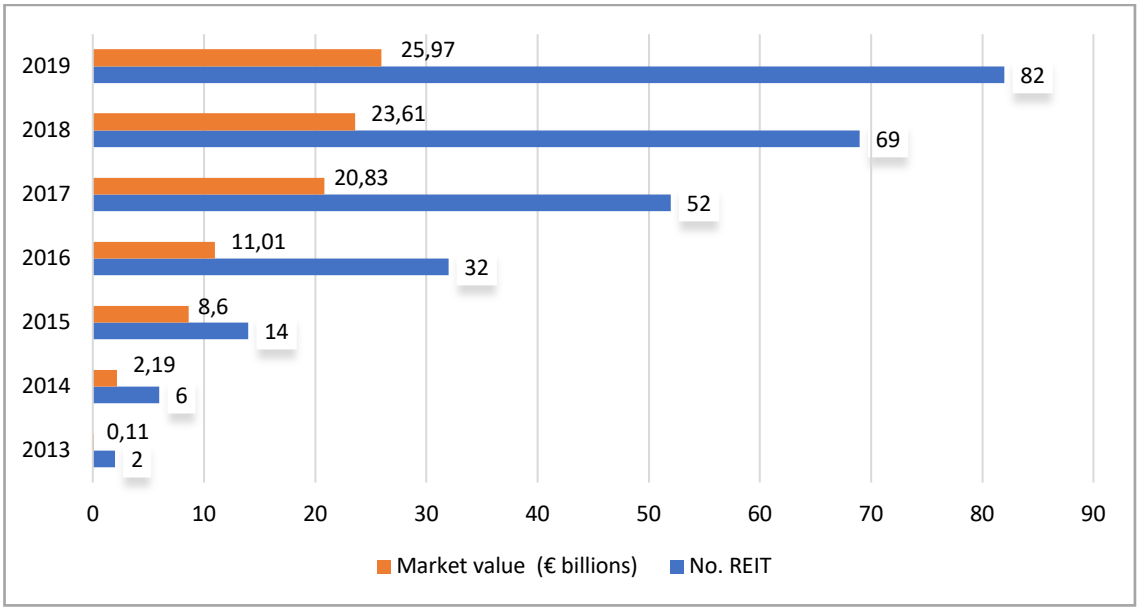

Figure 1. Time profile of REITs in the Spanish stock market during the period 2013-2019.

Source:

Own elaboration based on Bolsas y Mercados Españoles (2019).

[5] The main modifications included in Spanish Law 16/2012 were, among others, the introduction of requirements for a more lax quotation, the reduction of the number of properties per REIT from three to one, the reduction of the minimum property holding period from 7 to 3 years, the reduction of the minimum share capital from 15 to 5 million euros, or the elimination of the maximum debt percentage of 70% (Taltavull de La Paz & Cuenca, 2013).

At the end of 2019, Spanish REITs ranked third in Europe in terms of market capitalisation, with 11.76%, only surpassed by the United Kingdom (37.26%) and France (26.86%), and first in terms of the number of REITs, as shown in Table 2 (EPRA, 2020).

Table 2. REIT markets in Europe.

Country/region	Number of REITs	No. REITs/ Total No. REITs (%)	Capitalisation (million USD)	Capitalisation/ Total capitalisation (%)
United Kingdom	54	23.89	90.95	37.26
France	28	12.39	65.57	26.86
Spain	**78**	**34.51**	**28.71**	**11.76**
Netherlands	5	2.21	25.66	10.51
Belgium	17	7.52	21.29	8.72
Germany	6	2.65	5.53	2.27
Ireland	3	1.33	2.14	0.88
Greece	4	1.77	2.00	0.82
Italy	3	1.33	1.16	0.48
Russian Federation	1	0.44	0.56	0.23
Bulgaria	25	11.06	0.48	0.20
Poland	2	0.88	0.04	0.02
Total Europe	226	100.00	244.09	100.00

Note:
Figures at 31 December 2019.
Source:
Own elaboration based on (EPRA, 2020).

Historically, real estate activity in the Spanish economy has always been relevant. The weight of real estate activities over the total GDP in Spain during the period analysed has reached around 10% from the supply side (according to data from the Spanish National Statistics Institute). Likewise, investment in the real estate sector in Spain in 2019 exceeded 12,000 million euros (excluding corporate operations), similar to 2018. Of this amount, foreign direct investment representing 60% of the total volume of investment in this sector (61% in 2018), REITs for 9% (25% in 2018) and the rest was national investment (CBRE, 2019, 2020). These figures reflect the growing attractiveness of this sector for international investors. In this regard, it is worth highlighting the presence of foreign investors on the Spanish stock exchange, with an 80% participation in the turnover traded on the Spanish stock markets and 48% ownership of the listed Spanish companies at the close of 2018 (Bolsas y Mercados Españoles, 2018b, 2019) and 50.2% of the total value of Spanish listed companies at the close of 2019 (Bolsas y Mercados Españoles, 2020).

In the last two years of the period under review, 2017 and 2018, the real estate sector accounted for 76% and 79% of the number of flotations on the Spanish stock market, respectively. If we only take into account the admissions of REITs, these figures stand at 68% and 75%, respectively.

The amendment of the legislation concerning REITs in Spain in 2012 made some of the requirements for these vehicles more flexible in order to enhance what had been a totally inoperative system up to that time. Spanish Law 16/2012 introduced the possibility for REITs to be admitted on a Multilateral Trading Facility (MTF), and not only on a regulated market. As a result, in February 2013 a specific segment dedicated to REITs was created in the Spanish Alternative Stock Market (MAB), the Spanish MTF. In this regard, of the 73 REITs existing in the Spanish market as of 31 January 2019, 68 were incorporated within the MAB as opposed to the 5 admitted to the Spanish regulated market, more widely known as the *Mercado Continuo* or SIBE.[6,7]

The MAB has a far more flexible regulation than the *Mercado Continuo* in terms of admission and trading requirements, without foregoing an adequate level of transparency (see Table 3).

It is worth highlighting the presence of two figures in this market, namely: the Registered Advisor (RA) and the Liquidity Provider. The main functions of the Registered Advisor (specialised professionals who act as interlocutors between companies and the market) are to assess the suitability of companies for admission and to give advice on the compliance required by the market (Bolsas y Mercados Españoles, 2016). The main task of the Liquidity Provider is to favour the liquidity of transactions and achieve a sufficient liquidity frequency (Bolsas y Mercados Españoles, 2017). Trading is mainly carried out multilaterally and electronically in the SIBE-SMART (the same electronic system as the one used in the *Mercado Continuo*) through a trading system called fixing.[8]

[6] As of 31 January 2019, there are two Spanish REITs listed on the Euronext Access.
[7] In the case of the 5 REIT IPOs carried out in the Spanish *Mercado Continuo* during the period under analysis (November 2013-January 2019), the raw mean initial-day return was -3.25% (-3.73% and -2.72% adjusted for the Madrid Stock Exchange General Index and the FTSE EPRA/NAREIT Spain, respectively).
[8] Shares are auctioned throughout the session (from 8.30 am to 4.00 pm) with two price fixing and stock allotment times, at 12 noon and 4 pm. The price resulting from the second auction is the closing price of the session (provided that at least 200 shares are traded).

Table 3. Main requirements for the admission and trading of REITs in the MAB.

ADMISSION	
Minimum share capital	There is no minimum.
Previous placement	Initial Public Offering (IPO), Secondary Offering or direct listing.
Free Float	It shall be necessary for shareholders to hold <5% of the share capital, i.e., a number of shares that corresponds to at least either (i) an estimated market value of €2 million, or (ii) 25% of the shares issued by the company.
Initial informative documentation	Informational Document on Admission to the Market (IDAM with detailed information about the company, its business and perspectives. Historical financial information: for the last 3 years with the audit report for each year. Companies that do not have 24 consecutive months of audited information must present forecasts for the current year and the following year.
Lock-up	The main shareholders, directors and executives shall commit to not selling shares during the year following the admission of the company, except for sale offer (public or not).
Other agents	Appointment of Registered Advisor (RA) and Liquidity Provider.
TRADING	
Trading type	Electronic, via the SIBE-SMART.
Trading System	Single-price setting or fixing (multilateral trading) and block trading (bilateral trading).

Source:
Own elaboration based on Bolsas y Mercados Españoles (2016, 2017, 2018a).

Finally, in order to enter the market, there is no obligation to make an Initial Public Offering of shares (IPO) if, prior to entry, the requirement concerning the minimum free floating capital set out above in Table 3 is met (Bolsas y Mercados Españoles, 2018a).[9] In this respect, until now, all REITs in this market have been incorporated by direct listing. In these cases, the price taken as the initial price for admission (reference price) does not come from a placement, but is determined by the board of directors of the REIT based on the valuation of the company carried out by an independent expert (appraiser)

[9] Article 35 of Royal Legislative Decree 4/2015, of 23 October, approving the consolidated text of the Spanish Securities Market Act, includes the definition of an initial public offering and secondary offerings.

(Bolsas y Mercados Españoles, 2018a). In some cases, however, a private placement of shares occurs prior to listing for trading. If said placement complies with the requirements established in Circular 2/2018 of the MAB (Bolsas y Mercados Españoles, 2018a), the reference price for the initial trading of the company's shares on the market will be the price of the aforementioned placement.

3. EMPIRICAL EVIDENCE OF UNDERPRICING IN REITS

The underpricing that occurs when a firm goes public is one of the most interesting topics in the financial literature. The first studies documenting the presence of underpricing in IPOs date from the 1970s in the US market (Ibbotson & Jaffe, 1975; McDonald & Fisher, 1972; Reilly & Hatfield, 1969). In recent years, researchers have analysed this underpricing from different points of view, proposing several theories that attempt to explain the reason for the existence of these initial-day positive returns. The most notable papers include those by Beatty & Ritter (1986), Loughran & Ritter (2004, 2002), Ritter & Welch (2002), Rock (1986) and Welch (1989).

With regard to the underpricing of REITs, although there are a large number of studies that analyse the matter, the majority refer to the North American market or the Asia-Pacific area. In recent decades, although there has been a proliferation of studies on underpricing in the real estate sector in European markets, few of them deal with REITs because in Europe they became popular at a later date.

As observed in Table 4, the results on the underpricing of REITs are very diverse, ranging from a negative mean initial-day return of -2.82% (Wang et al., 1992) to a positive mean return of 11.82% (Ooi, 2009). Among the studies shown in Table 4, two that are worth highlighting are those by Chan et al. (2013) and Brobert (2016), since they include the European market in their analysis of the underpricing of REITs worldwide (with a significant mean underpricing in Europe of 6.74% and 6.55%, respectively). Ascherl & Schaefers (2018) analysed underpricing during the period 2000-2016 in a sample of 76 IPOs carried out by real estate companies and 31 REITs in the European market, their results showing a significant mean initial-day return of 5.69% and 2.02%, respectively. The underpricing for IPO REITs in the Turkish market between December 1996 and July 2014 is 7.6% according to the results obtained by Erol et al. (2020).

Gokkaya et al. (2015) and Ling et al. (2020) are the only ones that analyse the underpricing of REITs in the US market by breaking down the initial-day return into primary and secondary market returns.

Table 4. Summary of initial-day returns (IR) of REITs or property firms from selected studies.

	Country	Sample size and type	Sample period	Mean IR (%)
Global				
Chan et al. (2013)	Global	370 REITs	1996-2010	3.24**
Brobert (2016) [(a)]	Global	445 REITs	1996-2014	3.94***
North America				
Wang et al. (1992)	US	87 REITs	1971-1988	-2.82***
Ling & Ryngaert (1997)	US	85 REITs	1991-1994	3.60*
Londerville (2002)	Canada	13 REITs	1993-1998	1.71
Buttimer et al. (2005)	US	163 REITs	1980-2001	2.47***
Hartzell et al. (2005)	US	189 REITs	1980-1998	0.27
Chen & Lu (2006)	US	197 REITs	1980-1999	2.9 (NA)
Dolvin & Pyles (2009)	US	209 REITs	1986-2004	3.72 (NA)
Bairagi & Dimovski (2011)	US	123 REITs	1996-2010	3.18***
Gokkaya et al. (2015)	US	126 REITs	1993-2005	5.23***
Dimovski et al. (2017)	US	56 REITs	2010-2015	0.10
Ling et al. (2020)	US	183 REITs	1995-2017	3.48 (NA)

Table 4. cont.

	Country	Sample size and type	Sample period	Mean IR (%)
Asia-Pacific				
Dimovski & Brooks (2006a)	Australia	58 REITs	1994-2004	2.6 (SIG)
Dimovski & Brooks (2006b)	Australia	37 REITs	1994-1999	1.20
Kutsuna et al. (2008)	Japan	40 REITs	2001-2006	0.50
Ooi (2009)	Singapore	20 REITs	2002-2007	11.82***
Dimovski (2010)	Australia	45 REITs	2002-2008	3.37 (SIG)
Wong & Ong (2013)	Japan, Hong Kong, Singapore and Malaysia	78 REITs	2001-2008	3.10**
Dimovski (2016)	Australia	22 PROP 92 REITs	1994-2014	13.75 (NA) PROP 2.11 (NA) REIT
Saengchote & Charoenpanich (2021)	Thailand	66 REITs	2005-2019	2.45**
Ooi et al. (2018)	Japan, Hong Kong, Singapore and Malaysia	107 REITs	2001-2013	3.08***
Europe				
Brounen & Eichholtz (2001)	Europe	83 PROP	1990-2000	3.43 (SIG)
Brounen & Eichholtz (2002)	UK, France, Sweden	54 PROP	1984-1999	2.55**
Freybote et al. (2008)	Europe	105 PROP	1994-2006	7.26 ***
Brämisch et al. (2011)	Europe	120 PROP	1997-2007	6.00 (NA)
Ascherl & Schaefers (2018)[(b)]	Europe	76 PROP 31 REITs	2000-2016	5.69 *** PROP 2.02 *** REIT
Erol et al. (2020)	Turkey	25 REITs	1996-2014	7.60**

Notes:
PROP: property firms or *Real Estate Operating Company* (REOC).
NA: significance not given.
SIG: significance with no indication at what level.
[(a)] The sample includes 2 REITs from the Spanish market with a non-significant underpricing of 0.25%.
[(b)] The sample includes 3 REITs from the Spanish market with a non-significant underpricing of -1.00%.
***, **, * significant at the 1%, 5% and 10% levels, respectively.

Regarding the Spanish market, although there are some studies on the real estate sector (Akin et al., 2014; Gimeno & Martínez-Carrascal, 2010; McGreal & Taltavull de La Paz, 2012; Rodríguez & Bustillo, 2010; Taltavull de la Paz, 2014; Taltavull de La Paz & White, 2016), this is not the case for REITs. The recent creation of this vehicle, and consequently the reduced sample that was available up until now, is, as far as we know, the reason why it has been impossible to analyse it empirically. Thus, we find descriptive articles on REITs in Spain (Capellán et al., 2021; Fernández et al., 2012; García-Lamarca, 2021; Roig Hernando & Soriano Llobera, 2015; Taltavull de La Paz & Cuenca, 2013) but few of an empirical nature (López-Penabad & Vázquez, 2020; Marzuki & Newell, 2018) and none referring to analyses of their underpricing.

4. THEORETICAL FRAMEWORK AND HYPOTHESES

There is a significant body of academic literature on the theories explaining underpricing. Ritter & Welch (2002) classify them mainly in three groups: asymmetric information models, symmetric information models and a third group of novel theories (which could also be classified in the two previous groups). Yet, regardless of whether they are based on information asymmetry, on agency theories, behavioural explanations, ownership-control relationship, signalling theories, institutional factors, etc., all of them start out with the existence of an Initial Public Offering of shares when they are launched on the stock market in order to substantiate the underpricing. Therefore, and since one of the most relevant differences in the Spanish REIT market lies in the non-existence of IPOs in their entry into the MAB, because it occurs through direct listing, we do not expect to find underpricing in the price set by the issuer (Derrien & Kecskés, 2007). This leads us to formulate the following hypothesis:

> ***H1.a.*** *As there is no initial public offering of shares, no underpricing is expected in the price set by the issuer.*

However, within this direct listing, some REITs have chosen to perform a private placement of shares (up to six months) before going public. Sharpe & Woo (2005) find underpricing due to the existence of information asymmetry in the listing of Australian companies that carried out a private placement six months prior to their flotation (although less than in the case of companies that performed an IPO). Therefore:

H1.b. *REITs that perform a previous private placement of shares will be underpriced, unlike REITs that do not.*

Finally, and following Gokkaya et al. (2015) and Ling et al. (2020), these hypotheses will be tested by distinguishing between primary and secondary market returns.

As the results obtained show the existence of underpricing in the price determined by the issuers in the listing of REITs on the stock exchange in Spain, both for those that performed a previous private placement and for those that did not, we have selected a series of variables and put forward some hypotheses to be tested on the factors that can explain this underpricing. These variables and hypotheses have been selected within the context of the different existing underpricing theories and are designed to cover the specific characteristics of this type of investment vehicle and the peculiarities of the market where they are listed.

Within the theories of information asymmetry, and following Beatty & Ritter (1986), we assume that the greater the *ex ante* uncertainty about the value of the company is, the greater the underpricing will be. The first approximation to the *ex ante* uncertainty that we propose, and which has to do with the characteristics of the issuing company, is size. Following Dimovski et al. (2017), we have used market capitalisation as a proxy variable of firm size, admitting that large companies transmit a lower degree of uncertainty (Ibbotson et al., 1994).

H2.a. *The larger the size of the issuing company is, the lower the underpricing will be.*

We have also taken into account the level of leverage as a measure of *ex ante* uncertainty. Brounen & Eichholtz (2002) and Dimovski & Brooks (2006b), following Ling & Ryngaert (1997), argue that the higher a company's level of leverage is, the fewer opportunities for growth there will be and therefore it will be easier to value it. Likewise, the higher the level of leverage is, the more supervision or monitoring there will be. Based on the above, we propose the following hypothesis:

H2.b. *The higher the company's level of leverage is, the lower underpricing will be.*

In general, it is considered that there is greater uncertainty in younger companies since the lack of historical background makes it more difficult to make forecasts about the future (Ascherl & Schaefers, 2018; Dimovski et al., 2017). The age of the company is particularly important in this market since it has an influence on the obligation to provide audited financial information or only forecasts when joining it. Thus:

H2.c. *The older the company is, the lower the expected underpricing will be.*

Finally, we propose the last hypothesis about *ex ante* uncertainty. Another group of theories determine that the presence in the listing process of a reputable agent, whether an auditor (Bairagi & Dimovski, 2011; Beatty, 1989; Dimovski et al. 2017; Titman & Trueman 1986) or an underwriter (Carter & Manaster, 1990; Chen & Lu, 2006; Ling & Ryngaert, 1997), mitigates informational asymmetry. In order not to lose their prestige, reputable agents, who have a greater capacity to analyse companies, seek less risky issuances by introducing information into the market and decreasing the *ex ante* uncertainty about the value of the company (Tiniç, 1988). Investors can deduce that an issue is of higher quality and/or less speculative if it is backed by a reputable agent. Given the specific characteristics of our study, in which there is no IPO in the listing process and there is no underwriter, and from the perspective that the specialist agents involved in the offer transmit information about its value, we have deemed it relevant to include the company's valuing entity as a reputable agent, replacing the underwriter (Roosenboom, 2012). This agent values the company and sets a stock price that serves as the basis on which the board of directors of the REIT determines the reference price for the listing on the market. Likewise, and given the fact that REITs are obliged to engage the services of a Registered Advisor (see Table 3), we have also included this figure as a reputable agent. In the absence of a specific ranking to measure the prestige of these specialist agents, we have developed our own (see Appendix 1, Table A1), following the methodology developed by Migliorati & Vismara (2014). For each type of agent, a hierarchical criterion has been used based on the number of entries in which the agent has participated. Therefore, based on the fact that by choosing a reputable agent, the REIT is signalling the value of the company and reducing uncertainty (Michaely & Shaw, 1994), we expect that:

H2.d. *The higher the prestige of the agent (appraiser, registered advisor or auditor) is, the lower the underpricing will be.*

The following hypothesis could be included within the signalling theories. Thus, one of the signalling tools used by companies, related to the capital structure, is the proportion of shares held by executives. Grinblatt & Hwang (1989) and Leland & Pyle (1977) establish that the fraction of shares held by shareholders in executive positions is a vehicle for conveying private information to investors. Hence, the bigger the proportion of shares held by executives is, the greater will be the value and/or quality they are granting to the company (Erol et al., 2020). Likewise, assuming that the higher the percentage of shares held by executives is, the lower the external monitoring will be, and that greater underpricing attracts minority investors and makes it possible to reduce monitoring by large investors (Brennan & Franks, 1997; Wu, 2004) we propose the following hypothesis:

> ***H3.*** *The higher the percentage of shares retained by shareholders in executive positions is, the lower the underpricing will be.*

The following group of hypotheses relate underpricing to the stock market and industry environment. Several papers study the relationship between returns on the first day of trading and movements in the market in the weeks prior to entry (Brounen & Eichholtz, 2002; Dimovski et al., 2017; Ling et al., 2020; Saengchote & Charoenpanich, 2021; Wong & Ong, 2013). To measure it, we have used the Madrid Stock Exchange General Index (IGBM), which represents the general performance of the stock market in Spain. The following hypothesis has been formulated assuming that a high average return prior to the listing is indicative of an optimistic market (Miller & Reilly, 1987):

> ***H4.a***. *The greater the pre-listing stock market return is, the greater the underpricing will be.*

Within the variables that relate underpricing to the stock market sentiment, following Brobert (2016) and Ascherl & Schaefers (2018), we have considered whether listing takes place in a period of *hot* (*cold*) market when there have been ten or more (fewer) flotations in the year the REIT was launched on the market. Accordingly, we test the following hypothesis:

> ***H4.b***. *Underpricing will be greater when the listing occurs during a hot market.*

As for the industry conditions prior to the listing (Dimovski & Brooks, 2006a, 2006b), the positive evolution of rental income in Spain in the months prior to the listing is indicative of an optimistic market. The returns in the first few days of trading are expected to be in line with this behaviour. We therefore propose the following hypothesis:

***H4.c**. The more positive the evolution of the industry is prior to the listing, the greater the underpricing will be.*

Finally, we have included a series of hypotheses regarding the characteristics of REITs and the peculiarities of the market in which they are listed.

In relation to the property strategy followed by REITs, Brobert (2016), Brounen & Eichholtz (2002), Chen & Lu (2006) and Gokkaya et al. (2015) find that REITs with a diversified property strategy are more underpriced than those that follow a specialised strategy because the latter are easier to value. Accordingly, we propose the following hypothesis:

***H5.** Underpricing is greater when the property strategy is diversified.*

Following Chan et al. (2013) and Chen & Lu (2006), greater underpricing is expected in internally managed REITs than in the case of those with external management. Hence:

***H6.** Underpricing is greater when the management of the company is internal.*

Finally, Roosenboom (2012) analyses how underwriters use several different valuation methods to determine the fair value of the company prior to setting the price of the IPO, a price that is usually finally set below the fair value obtained. He finds that, among other factors, part of the underpricing stems from this intentional discount on the price. In line with this author, we state the following hypothesis:

***H7.** Underpricing is greater when the reference price is equal to or less than the equilibrium price determined by the appraiser.*

5. SAMPLE

In order to compose the final sample used in this study, we started out with all the REITs that had been listed in the MAB since the creation of their own particular segment on 15 February 2013 until 31 January 2019.[10] During this period, there have been 71 admissions. From this initial sample, we have discarded those companies that have not traded on the first day or have only done so through block trading, as the latter is not considered an official closing price. As a result, the sample was reduced to 43 REITs. Finally, we have eliminated two more companies from the sample because they are considered outliers with respect to the initial-day return (IR).[11] Hence, the final sample consists of 41 REITs.

Given the special characteristics of the market, and since the REITs in the sample have not selected the option of going public through an IPO but instead by direct listing, we have considered it relevant to segment the sample according to whether or not there was a previous private placement in order to be able to study the underpricing that exists in said listing. To make up the subsample with previous private placement (PPP), based on MAB Circular 2/2018 (Bolsas y Mercados Españoles, 2018a), the REITs were classified as such if, within the six months prior to the application for admission of their shares, they carried out a placement of shares or a financial transaction in which the consideration for the sale of the shares is in cash and not for credit compensation, and when the price was equal to the reference price for the start of trading in the company's shares on the market. Altogether 12 REITs carried out previous private placement. The remaining 29 REITs form part of the subsample without previous private placement (non-PPP).

Data on market admissions, financial information and other information about the REITs were obtained from the Informational Document on Admission to the Market (IDAM) and the relevant facts available on the MAB website. The stock market data are from the Bolsas y Mercados Españoles Group, with the exception of the FTSE

[10] The end of the period was taken to be 31 January 2019 instead of the end of the financial year (31 December 2018) as, historically, most listings take place during the periods June-July and December-January.

[11] For the calculated mean and standard deviation of the initial-day return (IR_i), extreme values have been considered as being those that exceed three times the standard deviation of the target variable.

EPRA/NAREIT Spain index, which was obtained from the Thomson Reuters Datastream database.

6. METHODOLOGY

6.1. UNDERPRICING (UNIVARIATE ANALYSIS)

We have measured the underpricing of the shares of REITs going public by the return on the first trading day, Initial-day Return *(IR_i)*, obtained as the relative difference between the closing price of share *i* on the first day of trading (P_{ic}) and the reference price (P_{ir}) as shown in expression (1).

$$IR_i = (P_{ic} - P_{ir})/P_{ir} \quad (1)$$

In addition, IR_i has been adjusted by the market return. Two indices have been used for this purpose: the Madrid Stock Exchange General Index (*AR IGBM*), indicative of the general performance of the Spanish market, and the FTSE EPRA/NAREIT Spain (*AR EPRA*), indicative of the specific performance of REITs in the Spanish stock market.

Following Barry & Jennings (1993) and Bradley et al. (2009) in the case of non-REIT companies and Gokkaya et al. (2015) and Ling et al. (2020) in the case of REITs, we have split the initial-day return into two components: the return generated in the primary market or reference-to-open return, primary market return (PR_i), and the return generated in the secondary market or open-to-close return, secondary market return (SR_i), computed in accordance with expressions (2) and (3) respectively.

$$PR_i = (P_{io} - P_{ir})/P_{ir} \quad (2)$$

$$SR_i = (P_{ic} - P_{io})/P_{io,} \quad (3)$$

where P_{io} is the opening price or the price of the first fixing on the first day of trading of company *i*. Likewise, the buy-and-hold return *($BHR_{i\tau}$)* has been calculated for the four days after entry in accordance with expression (4).

$$BHR_{i\tau} = [\prod_{t=1}^{\tau}(1 + R_{it})] - 1, \quad (4)$$

where τ is the period in days. The abnormal buy-and-hold return of REIT *i* ($BHAR_{i\tau}$) was calculated in accordance with expression 5.

$$BHAR_{i\tau} = BHR_{i\tau} - BHR_{\ index,\tau}\ , \tag{5}$$

where $BHR_{index,\tau}$ is the buy-and-hold return of either the Madrid Stock Exchange General Index or the FTSE EPRA/NAREIT Spain.

The null hypothesis to be tested is that the mean (median) of the cross-section of the returns is equal to zero. To test the mean, we have used a parametric test based on the conventional *t* statistic. In addition, in order to make our results more robust, we employ the bootstrap methodology (Efron, 1982; Wehrens et al., 2000), which generates the empirical distribution of the returns under the null hypothesis, thereby relaxing the hypotheses of normality, seasonality and temporal independence of the observations. With regard to the median, we use the Wilcoxon signed rank test. To calculate the differences between the mean values we have performed the parametric *t* test and the bootstrap methodology. The difference in the medians was tested using the Kruskal-Wallis test.

6.2. DETERMINING FACTORS (MULTIVARIATE ANALYSIS)

The explanatory variables selected to test the hypotheses set out in section 4 are shown in Table 5. Table 6 offers a summary of the main characteristics of the sample.

In general, we observe that the REITs in the sample could be defined, if we compare them with other studies on this type of company (Ascherl & Schaefers, 2018; Dimovski et al., 2017; Dimovski & Ratcliffe, 2011), as small, young enterprises, with a medium level of leverage and with a reduced percentage of shares held by executives. On the other hand, the stock market conditions in Spain could be described as bearish during the sample period. The opposite happens with the evolution of the pre-listing sector, since it would be a bullish market.

Table 5. Definition of the explanatory variables selected to test the hypotheses of REIT underpricing.

SIZE	Market capitalisation on listing day (number of shares by reference price), in millions of euros.
DEBT	Total debt to total assets ratio (both from the latest annual audited accounts or interim financial information subject to a limited review by its auditor, published in the IDAM).
AGE	Age of the issuing company from the constitution date to the listing day.
APPRAISER	Ranking of the appraiser based on the number of listings in which the agent has participated.
RA	Ranking of the Registered Advisor based on the number of listings in which the agent has participated.
AUDITOR	Ranking of the auditor based on the number of listings in which the agent has participated.
EXECUTIVES	Percentage of shares, directly and indirectly, retained by shareholders in executive positions according to IDAM information.
IGBMRET	Buy-and-hold return of the IGBM computed 30 days prior to the listing.
MARKET	Dummy variable equal to one if there have been ten or more flotations in the year the REIT was listed (hot market), and zero (cold market) otherwise.
INDUSTRY	Change (in percentage) of the rental income in Spain in the quarter prior to the listing (data obtained from the real estate portal "idealista.com").
PROPERTY	Dummy variable equal to one if the property strategy followed by the REIT is diversified and zero if the property strategy followed by the REIT is specialised. Following Brounen & Eichholtz (2002), REITs having more than 80% of their total assets in one property type are regarded as specialised.
MANAGEMENT	Dummy variable equal to one if the management of the company is internal and zero if the management is external.
REFERENCE PRICE	Dummy variable equal to one if the reference price determined by the board of directors of the REIT is equal to or less than the equilibrium price determined by the appraiser and zero otherwise.

Table 6. Summary statistics for the explanatory variables employed in the OLS regression models.

	N	Mean	Std. dev.	Min.	Median	Max.
SIZE (million €)	41	167.07	314.85	5.91	65.78	**1,838.56**
DEBT (%)	41	32.30	22.90	0.00	37.10	77.90
AGE (years)	41	4.85	7.90	0.19	2.17	**42.27**
APPRAISER	36	0.678	0.331	0.11	0.78	1.00
RA	41	0.653	0.393	0.05	1.00	1.00
AUDITOR	41	0.603	0.375	0.06	0.63	1.00
EXECUTIVES (%)	41	22.89	30.89	0.00	5.10	98.72
IGBMRET (%)	41	-2.40	5.60	-15.40	-1.40	6.00
INDUSTRY (%)	41	2.00	1.60	-1.00	2.00	5.20
***Dummy* variables**		***Dummy* 0**			***Dummy* 1**	
MARKET	41	12			29	
PROPERTY	41	29			12	
MANAGEMENT	41	33			8	
REFERENCE PRICE	36	15			21	

Notes:
The variables are described in Table 5.
Figures in bold are outliers. Extreme values have been considered as those that exceed three times the standard deviation of the variable.

We explore the factors that explain REITs' underpricing through several multiple regression models, in which the dependent variable is the buy-and-hold return until the third day of trading (BHR_{i3}) in accordance with expression (6).[12]

$$BHR_{i3} = \alpha + \sum_{j=1}^{m} \beta_j \ X_{ij} + \varepsilon_{i,} \qquad (6)$$

where (BHR_{i3}) is the buy-and-hold return until the third day of trading of company i calculated in accordance with expression (4) and X_{ij} are the independent variables that correspond to the selected explanatory variables.

[12] The hypotheses put forward have also been tested for the initial-day return, both raw and adjusted (IR_i, $IR_i IGBM, IR_i EPRA$). The results can be obtained from the authors on request.

In order to minimise the influence of extreme values on expression (6), the natural logarithms of the variables SIZE (LNSIZE), AGE (LNAGE) and DEBT (LN (1+DEBT)) have been used (Brobert, 2016; Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997).[13]

Each regression model has been estimated by cross-sectional Ordinary Least Squares (OLS), applying the methodology proposed by White (1980) to obtain a robust estimation of the parameters in the presence of heteroscedasticity. Additionally we have used the bootstrap procedure (Fox, 2008), as we have a small sample size. For the same reason, we considered it appropriate not to include more than 7 explanatory variables in the same model. To analyse the absence of multicollinearity among the regressors, we have used Spearman's *Rho* correlation coefficient among the different variables of each model (see Table A2).[14] We have also used the Variance Inflation Factor (VIF).

7. RESULTS

7.1. UNDERPRICING (UNIVARIATE ANALYSIS)

The results obtained in the analysis of the underpricing in the listing of the REITs are shown in Table 7. We note that underpricing does exist at listing, since we found a significant mean IR of 1.58%. The results in terms of market-adjusted returns are also positive and significant values around this figure. The median is also positive and significant. These results are contrary to what was stated in hypothesis H1.a, in which, in the absence of a public offering, no underpricing was expected in the price fixed by the issuer at the time of the listing. If we compare our results with the results in other markets (Table 4), the mean IR of Spanish REITs is within the wide range of underpricing reported in these studies. It is also close to that of 1.71% obtained by Londerville (2002) in the Canadian market, that of 1.20% observed by Dimovski & Brooks (2006b) in the Australian market and the figure of 2.02% obtained by Ascherl & Schaefers (2018) for REITs in the European market. Conversely, our result of 1.58% is well below that of

[13] For the mean and the standard deviation of the buy-and-hold return of the third day that was calculated, extreme values have been considered as those that exceed three times the standard deviation of the target variable.

[14] In the defined models there is no pair of variables with a correlation greater than 38%, with the exception of model 8, in which the variables RA and DEBT have a correlation of 45%. However, given their null economic relationship, it has been considered correct to include them in the same model.

9.87% obtained by Soler, Farinós & Ibañez (2015) in their analysis of the underpricing for non-REIT companies that went public on the MAB during the period 2009-2014.

Table 7. Raw and market-adjusted initial-day return for the full sample.

	IR	AR IGBM	AR EPRA
Mean	*** 1.58 [a]	*** 1.44 [a]	*** 1.41 [a]
Median	1.00 [a]	0.77 [a]	1.33 [a]
Maximum	7.69	8.22	5.80
Minimum	0.00	-3.76	-2.58
Standard deviation	1.83	2.42	1.92
Sample size (N)	41	41	41

Notes:
Data in % except sample size.
IR: raw initial-day return.
AR IGBM: initial-day return adjusted with the Madrid Stock Exchange General Index (IGBM).
AR EPRA: initial-day return adjusted with the FTSE EPRA/NAREIT Spain index.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
[***, **, *] significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

Subsequently, and following Barry & Jennings (1993) and Bradley et al. (2009) in the case of non-REIT companies, and Gokkaya et al. (2015) and Ling et al. (2020) in the case of REITs, Table 8 shows the results of the underpricing when we break down the initial-day return (IR) into primary (PR) and secondary (SR) return.

In Table 8 it can be seen that the PR presents positive and significant mean and median values, which is not the case with the SR. As we can see in Panel B of Table 8, the initial-day and primary market returns have significantly higher means and medians than the secondary return on the first day of trading, since most of the initial-day return (83%) occurs during the first fixing or first moment of trading. That is, it is the original shareholders and/or those who took part in the previous private placement who are rewarded on the first day of trading. However, unlike what happens in the analysis carried out by Gokkaya et al. (2015) on the US market, in which the underpricing is resolved in the primary market, in our case the underpricing continues until the third day of trading, as will be seen later in Table 11.

Table 8. Raw initial-day return and primary and secondary market return for the full sample.

Panel A. Statistics	**IR**	**PR**	**SR**
Mean	*** 1.58 [a]	*** 1.31 [a]	* 0.27
Median	1.00 [a]	0.95 [a]	0.00
Maximum	7.69	5.00	4.50
Minimum	0.00	0.00	-2.44
Standard deviation	1.83	1.32	1.15
Positive over total cases	68.29	73.17	36.59
Number of cases with zero return	13	11	26
Sample size (N)	41	41	41
Panel B. Test of differences	**IR – PR**	**PR – SR**	**IR - SR**
Mean differences	0.27	*** 1.06 [a]	*** 1.31 [a]
Median differences	0.05	0.95 [a]	1.00 [a]

Notes:
Data in % except sample size and number of cases with zero returns.
PR: primary market return.
SR: secondary market return.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
[***, **, *] significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

In Table 9 and Table 10 we can see the results obtained with respect to the underpricing obtained by dividing the sample into the REITs that have carried out previous private placement (PPP) and those that have not (non-PPP). In Table 9 we observe that for both subsamples the raw and adjusted returns are positive and significant. In Panel B, we see that, in line with hypothesis H1.b, the average return of the subsample with PPP is higher than the sample without previous placement. However, since this difference is only significant at 10% using the bootstrap methodology, these results must be interpreted with caution.

Table 9. Raw and market-adjusted initial-day return and raw returns tests. Segmentation of the sample according to whether or not there was a previous private placement.

Panel A: Returns and statistics	Previous private placement sample (PPP)	Non-previous private placement sample (non-PPP)
Raw initial-day return (IR)		
Mean	*** 2.21 [a]	*** 1.31 [a]
Median	1.83 [a]	0.95 [a]
Maximum	5.83	7.69
Minimum	0.00	0.00
Standard deviation	1.90	1.77
IGBM market-adjusted initial-day return (AR IGBM)		
Mean	*** 2.37 [a]	** 1.07 [b]
Median	2.12 [a]	0.72 [b]
Maximum	6.47	8.22
Minimum	-0.06	-3.76
Standard deviation	2.09	2.48
EPRA market-adjusted initial-day return (AR EPRA*)*		
Mean	*** 2.04 [a]	*** 1.14 [a]
Median	2.15 [a]	1.18 [a]
Maximum	5.51	5.80
Minimum	-0.72	-0.26
Standard deviation	1.76	1.94
Sample size (N)	12	29

Panel B. Raw-return tests	PPP – non-PPP
Mean differences	* 0.91
Median differences	0.88

Notes:
Data in % except sample size.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

Table 10 exhibits the results obtained in the breakdown of the initial-day return with the segmented sample. They are in line with those obtained for the full sample (Table 8).

Table 10. Raw initial-day return and primary and secondary market returns. Segmentation of the sample according to whether or not there was a previous private placement.

Panel A. Returns	**IR**	**PR**	**SR**
Previous private placement (PPP)			
Mean	*** 2.21 [a]	*** 1.60 [a]	0.61
Median	1.83 [a]	0.93 [a]	0.00 [c]
Maximum	5.83	5.00	4.50
Minimum	0.00	0.00	-0.82
Standard deviation	1.90	1.63	1.13
Positive over total cases	83.33	75.00	50.00
Number of cases with zero return	2	3	6
Sample size (N)	12	12	12
Non-previous private placement (non-PPP)			
Mean	*** 1.31 [a]	*** 1.19 [a]	0.12
Median	0.95 [a]	0.95 [a]	0.00
Maximum	7.69	4.80	2.75
Minimum	0.00	0.00	-2.43
Standard deviation	1.77	1.18	1.05
Positive over total cases	62.07	72.41	31.03
Number of cases with zero return	11	8	20
Sample size (N)	29	29	29
Panel B. Contrast	**IR - PR**	**PR - SR**	**IR - SR**
Previous private placement (PPP)			
Mean differences	0.61	0.99	** 1.61 [b]
Median differences	0.90	0.93 [c]	1.83 [b]
Non-previous private placement (non-PPP)			
Mean differences	0.12	*** 1.07 [a]	*** 1.19 [a]
Median differences	0.00	0.95 [a]	0.95 [a]

Notes:
Data in % except sample size and number of cases with zero returns.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
[***, **, *] significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

Finally, in view of the results obtained, and in order to analyse whether the underpricing extends beyond the first trading session, we have calculated the adjusted raw return for each of the four days following market entry using the closing prices for each session. In addition, we calculated the buy-and-hold return, both raw and market adjusted, from the first day to each of the first five days of trading. Table 11 shows that both the mean and the median (in brackets) of the raw and the market-adjusted returns of

the days after the listing, despite being lower than the initial ones, are positive and significant until the third day of trading. That is to say, although the main adjustment in the price occurs on the first trading day, it continues until the third day. Thus, the buy-and-hold return for the third day of trading is 2.58% (2.63% and 2.45% adjusted for IGBM and FTSE EPRA/NAREIT Spain, respectively).

Table 11. Raw and market-adjusted returns for the first five trading days. Raw (BHR) and market-adjusted (BHAR) buy-and-hold returns. Final full sample.

	Sample size (N)	IR_t	AR_t IGBM	AR_t EPRA	$BHR\tau$	$BHAR\tau$ IGBM	$BHAR\tau$ EPRA
Day 1	41	*** 1.58 [a] (1.00) [a]	*** 1.44 [a] (0.77) [a]	*** 1.41 [a] (1.33) [a]			
Day 2	41	*** 0.60 [a] (0.00) [a]	*** 0.74 [a] (0.30) [b]	** 0.25 [b] (0.24) [b]	*** 2.20 [a] (1.43) [a]	*** 2.20 [a] (1.39) [a]	*** 1.97 [a] (1.25) [a]
Day 3	41	** 0.36 [b] (0.00) [b]	* 0.41 [c] (0.21)	** 0.42 [c] (0.16) [c]	** 2.58 [a] (1.52) [a]	*** 2.63 [a] (1.79) [a]	*** 2.45 [a] (1.74) [a]
Day 4	41	* 0.41 [c] (0.00) [b]	0.17 (0.13)	0.26 (0.00)	*** 3.01 [a] (1.52) [a]	*** 2.86 [a] (1.90) [a]	*** 2.50 [a] (1.40) [b]
Day 5	41	0.17 (0.00)	0.23 (0.01)	0.27 (0.00)	*** 3.20 [a] (1.52) [a]	*** 3.11 [a] (1.83) [a]	*** 2.93 [a] (2.15) [a]

Notes:
Data in % except sample size.
The median is reported between brackets.
BHR: buy-and-hold return.
BHAR IGBM: buy-and-hold return adjusted with IGBM.
BHAR EPRA: buy-and-hold return adjusted with FTSE EPRA/NAREIT Spain index.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

7.2. DETERMINING FACTORS (MULTIVARIATE ANALYSIS)

The results obtained for the eight estimated regression models are shown in Table 12. The F-statistic allows us to confirm that there is a significant linear relationship between the buy-and-hold return until the third day of trading and the explanatory variables taken together. In no model does the Variance Inflation Factor (VIFi) exceed a value of 5, so there are no multicollinearity problems between the explanatory variables.

Table 12. Results of OLS regression models of factors explaining REITs underpricing.

	M1	M2	M3	M4	M5	M6	M7	M8
Intercept	***0.044[a]	***0.034[a]	**0.036[a]	** 0.037[a]	***0.040[a]	**0.048[a]	***0.046[a]	***0.044[a]
LNSIZE		0.001						
LNDEBT	*-0.063[c]	-0.042	*-0.068[c]	**-0.070[b]	**-0.072[b]	-0.035	*-0.063[c]	*-0.066[c]
LNAGE		*-0.012[c]				-0.012		
APPRAISER				0.003				0.015
RA								-0.026
AUDITOR						-0.017		
EXECUTIVES	**-0.001[b]		**-0.001[b]	**-0.001[b]	*-0.001[b]		**-0.001[b]	***0.000[c]
IGBMRET	***0.214[a]	**0.283[b]	**0.193[a]	***0.216[a]	***0.238[a]	***0.290[b]	***0.218[a]	***0.196[a]
MARKET							-0.003	
SECTOR		0.370	0.264	0.269	0.311	0.380		0.347
PROPERTY			0.017					
MANAGEMENT					-0.012	-0.006		
REFERENCE PRICE	**0.018[b]	**0.019[b]	**0.019[a]	***0.021[a]	***0.023[a]	**0.018[b]	**0.018[b]	**0.024[a]
N	36	36	36	36	36	36	36	36
R^2	22.10%	25.51%	29.50%	24.50%	26.38%	28.87%	22.28%	30.46%
Adjusted R^2	12.10%	10.09%	14.89%	12.84%	11.14%	11.09%	9.32%	13.08%
F-test statistic	4.38[a]	2.94[b]	2.95[b]	3.73[a]	4.32[a]	2.00[c]	5.17[b]	3.15[b]
VIF	[1.09-1.33]	[1.14-1.48]	[1.09-1.40]	[1.19-1.40]	[1.09-1.38]	[1.14-2.43]	[1.07-1.33]	[1.21-1.57]

Notes:
Multiple linear regression models estimated by cross-sectional Ordinary Least Squares (OLS). Dependent variable is the buy-and-hold return until trading day 3. Heteroscedasticity has been corrected using White's methodology.
The variables are described in Table 5.
R^2*:* determination coefficient.
Adjusted R^2: adjusted determination coefficient.
VIF: Variance Inflation Factor. Maximum-minimum values are reported.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively. The *t*-statistic is reported in square brackets.
***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

As for the variables that approximate the level of uncertainty, we observe that neither SIZE nor AGE are statistically significant. In the first case, the results are contrary to those obtained by Dimovski et al. (2017), who show that there is positive and significant evidence of a relation between the size or capitalisation of REITs and underpricing. In the case of age, Ascherl & Schaefers (2018) and Dimovski et al. (2017) conclude that older companies experience less underpricing. Finally, the negative sign of

the coefficient of the DEBT variable confirms hypothesis H2.b, which suggests that the most levered companies are subject to greater supervision or monitoring, have fewer opportunities for growth, are easier to value and therefore experience less underpricing. However, the weak evidence of the relationship between the DEBT variable and underpricing means that it cannot be considered a relevant factor. Our results are in line with those obtained in other studies on REIT underpricing, such as those by Brounen & Eichholtz (2002), Dimovski & Ratcliffe (2011) and Ling & Ryngaert (1997).

With regard to the variables associated with the prestige of the specialist agents involved in the listing of the REITs (APPRAISER, RA and AUDITOR), the results achieved in the three variables are similar. In no case are they statistically significant, so we can conclude that these reputable agents are no related to the underpricing when the listing of REITs on the market (hypothesis *H2.d*). These results are similar to those obtained by Dimovski et al. (2017), but not in the case of Bairagi & Dimovski (2011).

As far as the proportion of shares held by executives (EXECUTIVES) is concerned, the variable is significant in the different models. The negative sign indicates that the greater the proportion of shares held by executives is, the greater the value/quality they are assigning to the company (signalling tool) and the lower the underpricing (*H3*) will be, as in the case of Erol et al. (2020). This result is robust to the different specifications analysed.

The following group of hypotheses (*H4.a, H4.b* and *H4.c*) refers to the influence of the stock market and industry conditions prior to the listing. The results obtained are dissimilar in the different variables. In the case of IGBMRET they are robust to different specifications, and the positive coefficient and the significance of this variable lead us to conclude that the stock market conditions prior to the listing influences the level of underpricing. Thus, in bullish markets the level of underpricing is higher than in bearish markets. Our results are in line with those of Ling et al. (2020) and differ from those obtained in the studies by Dimovski et al. (2017), Dolvin & Pyles (2009), Gokkaya et al. (2015) and Wong & Ong (2013), in which the variable that measures the stock market climate prior to listing is not significant. The INDUSTRY variable, although positive, is not significant, as occurs in the study by Dimovski & Brooks (2006a) but is the opposite to Dimovski & Brooks (2006b), where the sentiment of the real estate sector prior to the listing is positively and significantly related to underpricing. Finally, the variable

MARKET is not statistically significant, so it cannot be confirmed that underpricing increases (decreases) in hot (cold) market phases (*H4.b*), as in the cases of Ascherl & Schaefers (2018) and Brobert (2016).

The last variables analysed are more related to the specific characteristics of REITs and the peculiarities of the market in which they are listed. In line with the results obtained by Ascherl & Schaefers (2018), Brobert (2016), Brounen & Eichholtz (2002) and Gokkaya et al. (2015),[15] the PROPERTY variable is positively related to underpricing, i.e. there is greater underpricing when the investment strategy is diversified. However, as in the studies mentioned above, it is not statistically significant.

Chen & Lu (2006) conclude that internally managed REITs are more underpriced. In our case, the sign of the MANAGEMENT variable shows us that internal management is negatively related to underpricing, in addition to the fact that this variable is not significant.

Finally, the REFERENCE PRICE variable yields a positive and statistically significant result for the different specifications. The fact that the members of the board of directors set a reference price for the start of trading equal to or below the equilibrium price determined by the appraiser (*H7*) has a positive influence on the level of underpricing. Although this is a more specific variable of the peculiarities of the market analysed, there are studies in this same line such as Ooi et al. (2018) that find a positive and significant relationship (at 10%) of the variable that relates the placement price and the valuation with the level of underpricing.

8. CONCLUSIONS

The increase in the number of REITs listed on the stock market in Europe in recent years has stimulated the study of underpricing in these markets. In the case of Spain, the number of REITs has grown exponentially since they first entered the market in 2013. Compared to Europe, Spanish REITs rank third in terms of market capitalisation with 11.76% and first in terms of the number of REITs at the end of 2019 (EPRA, 2020).

[15] In the case of Gokkaya et al. (2015) the variable that measures diversification in investment is significant at 10%.

This study analyses the phenomenon of underpricing in a sample of 41 REITs on the Spanish market between November 2013 and January 2019. The sample was obtained from the Spanish Multilateral Trading Facility known as the Mercado Alternativo Bursátil (MAB). Although admissions to this market did not take place by means of Initial Public Offerings of shares, but instead were carried out through direct listing, the results obtained show that underpricing does exist. The raw mean initial-day return is statistically significant with a value of 1.58% (1.44% and 1.41% adjusted for the Madrid Stock Exchange General Index and the FTSE EPRA/NAREIT Spain, respectively). When we break down the initial-day return we find that the reference-to-open return (primary market return) captures most of the result (1.37%), while the open-to-close return (secondary market return) is 0.27%, both figures being significant. This mean initial underpricing is maintained if we split the sample into REITs that have performed previous private placement (2.21%) and those that have not (1.31%), and although it is greater in the first case, the difference between the two is only significant at 10% using the bootstrap methodology.

However, despite the fact that the main price adjustment occurs at the first moment of trading (first fixing), with the original shareholders and/or those who took part in the previous private placement being the ones who were rewarded, we have found that the underpricing extends beyond the first trading session, since the raw and market-adjusted returns on the days following the listing are positive and significant until the third day of trading. Thus, the buy-and-hold return for the third trading day is 2.58% (2.63% and 2.45% adjusted for IGBM and FTSE EPRA/NAREIT Spain, respectively).

Finally, after testing a series of hypotheses based on different theories in the literature, our results suggest that, with the caution that should be taken when the sample is small, there is no relation between the *ex ante* uncertainty about the value of the company and the REIT underpricing. However, within the signalling theories, we observe that the proportion of shares retained by shareholders holding executive positions, a signalling tool related to ownership structure, is a key factor in determining the level of underpricing. On the other hand, we have found that our results suggest that it is the general pre-listing stock market conditions that are related to underpricing rather than the industry-specific performance. To conclude, one of the main findings of this research is the fact that one of the differentiating characteristics of the market analysed (that is, the fact that the members of the board of directors of the REIT determine the reference price

for the start of trading based on the equilibrium price established by the appraiser) is particularly relevant to determine the level of underpricing.

In sum, this research makes three main contributions. Firstly, it provides national and international investors and analysts with added value in their analysis of investment opportunities across a relevant and growing sector like the Spanish real estate and across a booming vehicle such as REITs. Secondly, it provides REIT issuers with new tools when deciding on the possible pricing when going public, the REIT shareholding structure and the most suitable time to enter the market. Lastly, it allows the regulator to see how these investment vehicles perform from another perspective for the sake of possible future regulatory modifications. One of the future lines of research that we consider interesting is the analysis of the long-term evolution of the performance of REITs in the Spanish market, as well as the identification of the main characteristics that influence it.

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APPENDICES

Appendix 1. Ranking of the specialist agents involved in MAB listings.

For each of the specialist agents defined (appraiser, Registered Advisor and auditor), we have developed our own ranking following the methodology developed by Migliorati and Vismara (2014): the classification according to the number of listings in which each agent participates.

In each ranking, the specialist agent with the greatest number of listings is assigned rank 1, the rank of the other agents being established as a proportion of this maximum.

Table A1. Ranking of the specialist agents involved in MAB listing.

Panel A: Company appraisers ranking			**Panel B: Registered Advisors ranking**		
Institution	**No. listing**	**Ranking**	**Institution**	**No. listing**	**Ranking**
CBRE Valuation Advisory, S.A.	9	1.00	RENTA 4 Corporate, S.A.	22	1.00
Gesvalt Sociedad de Tasación, S.A.	8	0.89	ARMABEX, Asesores Registrados, S.L.	9	0.41
Ernst & Young Servicios Corporativos, S.L.	7	0.78	VGM Advisory Partners, S.L.U.	4	0.18
Aguirre Newman Madrid, S.A.U.	3	0.33	Deloitte, S.L.	2	0.09
Grant Thornton Advisory, S.L.P.	3	0.33	PKF Attest Servicios Empresariales, S.L.	1	0.05
Instituto de Análisis Inmobiliario, S.L.	2	0.22	Solventis A.V., S.A.	1	0.05
Deloitte Financial Advisory, S.L.	1	0.11	ARCANO Valores, A.V., S.A.	1	0.05
Knight Frank España, S.A.U.	1	0.11	GVC Gaesco Beka, S.V., S.A.	1	0.05
TINSA Tasaciones Inmobiliarias, S.A.U.	1	0.11			
Colliers International S.L.	1	0.11			

Panel C: Auditors ranking		
Institution	**No. listing**	**Ranking**
PricewaterhouseCoopers Auditores, S.L.	16	1.00
Deloitte Auditores, S.L.	10	0.63
Ernst and Young, S.L.	5	0.31
Gimeno Auditores, S.L.P.	2	0.13
Auren Auditores SP, S.L.P.	2	0.13
SCD Auditoría, S.L.P.	1	0.06
BDO Auditores, S.L.	1	0.06
Capital Auditors and Consultants, S.L.	1	0.06
KPMG Auditores, S.L.	1	0.06
CAUDISA MGC Compañía de Auditores, S.L.P.	1	0.06
Grant Thornton, S.L.P.	1	0.06

Appendix 2. Correlation matrix computed with the Spearman Rho for the explanatory variables used in the regression models.

Table A2. Correlation matrix computed with the Spearman Rho for the explanatory variables used in the regression models.

	LNSIZE	LNDEBT	EXECUTIVES	IGBMRET	RA	APPRAISER	AUDITOR	LNAGE	MARKET	PROPERTY	MANAG.	REF. PRICE	INDUSTRY
LNSIZE	1												
LNDEBT	0.2916 [c]	1											
EXECUTIVES	-0.4508 [a]	-0.2827 [c]	1										
IGBMRET	0.1949	-0.0376	0.0892	1									
RA	0.4310 [a]	0.4558 [a]	-0.2693 [c]	-0.3428 [b]	1								
APPRAISER	0.1365	0.1124	-0.1825	-0.0402	0.3923 [b]	1							
AUDITOR	0.0994	0.0974	-0.4340 [a]	0.0090	-0.0239	0.1351	1						
LNAGE	0.2047	0.3485 [b]	0.2112	0.1542	0.2743 [c]	-0.0394	-0.3217 [b]	1					
MARKET	0.1177	0.0817	-0.1633	0.0317	0.0372	0.2100	-0.0283	-0.0181	1				
PROPERTY	-0.1964	0.043	0.3789 [b]	0.1333	-0.0776	-0.2189	-0.5091 [a]	0.2012	0.0031	1			
MANAG.	0.0780	-0.015	0.3560 [b]	0.1222	0.0968	-0.0262	-0.3577 [b]	0.4473 [a]	-0.0890	0.2519	1		
REF.PRICE	0.1383	0.1003	0.0283	-0.1600	0.2058	0.0110	-0.1634	-0.0894	-0.0713	0.0713	0.1807	1	
INDUSTRY	0.0794	-0.0494	-0.0466	0.0310	0.0519	0.2798 [c]	0.0192	0.1194	0.4319 [a]	-0.0170	-0.0522	-0.2150	1

Notes:
The sample size is of 41, except in APPRAISER and REFERENCE PRICE which is 36.
[a, b, c] significant at the 1%, 5% and 10% levels , respectively.

Essay II

The Aftermarket Performance of Spanish REITs

1. INTRODUCTION

Several studies have examined the performance of IPO share prices during a long period after going public. Since the seminal study by Ibbotson (1975), evidence of the existence of negative abnormal returns over long periods of time after this event has become so generalised that it is now a well-accepted phenomenon (see section 3 for a review of previous empirical evidence).

However, the unique characteristics of Real Estate Investment Trusts (REITs) have motivated the study of this phenomenon separately from other types of companies. Outcomes in these investment vehicle markets do not necessarily reflect the trends of the industrial sector and, as we discuss in section 3, the evidence on the aftermarket performance of REIT IPOs is mixed, as it depends on the country (Chan et al., 2013), the time period, the cycle in which the IPO takes place and the methodology assumed to estimate the abnormal returns of the REIT (Buttimer et al., 2005; Chan et al., 2001; Joel-Carbonell & Rottke, 2009; Ooi et al., 2018; Wang et al., 1992). It is also affected by other issues such as the management structure, institutional involvement, the underwriter's reputation or the compensation structure of managers (Chan et al., 2013; Ling & Ryngaert, 1997; Ooi, 2009; Ooi et al., 2018).

This paper analyses the aftermarket performance of 44 REITs during the two years following their listing on the Spanish Alternative Stock Market (*Mercado Alternativo Bursátil* – MAB) over the period from November 2013 to January 2020 and investigates its relationship with the underlying firm, flotation and market characteristics.[1] The detection of abnormal performance after their admission is a critical issue since post-admission stock price underperformance reveals that firms were overpriced at the listing.[2] Unlike previous studies in other markets, one relevant feature of this research is that all the REIT flotations in the MAB were carried out through direct listing rather than by

[1] MAB is a recently created market that, due to its special characteristics, makes it possible to study some issues that cannot be addressed in other markets. In October 2020 this market was renamed BME MTF Equity and Spanish REITs have been listed since then in the so-called BME Growth segment of BME MTF Equity. Nevertheless, we have kept the original name as it was the one in force during the period under analysis.

[2] Castaño et al. (2020) studied the related phenomenon of underpricing for a sample of Spanish REITs. They found that Spanish REITs underprice by around 1.58% when going public.

means of an Initial Public Offering (IPO). However, some REITs opted for a private placement of shares prior to market entry (up to 6 months before).

Due to statistical and conceptual problems related to the estimation and testing of long-horizon returns, we have used different approaches to estimate abnormal returns: (i) the composition of monthly returns (buy-and-hold abnormal return, BHAR), and (ii) the addition of monthly returns (cumulative average abnormal return, CAR). In order to estimate abnormal returns, we have used a wide range of references (controls).

This research is of interest for several reasons. The first is the fact that it investigates the way REITs have been incorporated into the market and how the initial price of the quotation is set. As stated above, unlike other markets, Spanish REITs go public not through an Initial Public Offering (IPO) but through direct listing (DL) or introduction (companies are immediately transferred from being a private company to a public one).[3] Thus, the price taken as the initial admission price (reference price) does not come from a book-building route but is determined by the board of directors of the REIT based on the valuation of the company carried out by an independent expert (appraiser) (Bolsas y Mercados Españoles, 2018). Nevertheless, some REITs have chosen to make a private placement of shares prior to market entry (up to 6 months before), in which case the initial listing price is determined by the price of that private placement.

A second key characteristic of the Spanish market of REITs is its reduced liquidity. This lack of liquidity hinders the full and quick incorporation of information into prices.

The third interesting feature is the real estate activity in the Spanish economy, as well as its attractiveness to the international investment community. In 2019 direct investment in this sector in Spain exceeded 12,000 million euros (excluding corporate operations), which is similar to the figure for 2018, reaching a new record for the sixth consecutive year. Around 60% of the total amount was carried out by foreign direct investment. REITs invested 9% of the total, while the rest consisted of national investment (CBRE, 2020). In addition, foreign investors find the Spanish stock market

[3] See Bancel & Mittoo (2009), Pagano et al. (1998) and Röell (1996) for considerations on the decision to go public. Sanchis et al. (2020) analysed the determinants affecting the decision to go public of a sample of non-financial firms that were listed on the Spanish Market.

attractive, as evidenced by the fact that they owned 50.2% of the total value of Spanish listed companies at the close of 2019, an increase of more than 10 percentage points over the last decade and more than 20 percentage points since 1995 (Bolsas y Mercados Españoles, 2020).

The last point is the rise of REITs in Spain and the increase in the number of flotations of these companies. It is worth noting that at the end of 2019, Spanish REITs ranked third in Europe in terms of market capitalisation, and first in terms of the number of REITs (see Figure 2) (EPRA, 2020).

We obtain evidence that issuers experience economically and statistically significant negative abnormal returns during the two years after their listing regardless of the methodology we employ to estimate the abnormal returns. It should be noted that the underperformance increases in the first months after the listing, is slightly reduced around months 11–12, and then increases again and continues until month 24 after the listing. Moreover, our results suggest that the characteristics of the process of going public in this market explain the aftermarket performance to a greater extent than the variables generally used in the abnormal long-run performance literature. Thus, REITs that have carried out a previous private placement and in which the members of the board of directors set a reference price for the start of trading that is above the price determined by the appraiser underperform less severely than their counterparts. This question is of interest both to investors and to regulators.

This is the first piece of research, as far as we know, to analyse the existence of abnormal performance after the listing of REITs on the Spanish market. The recent incorporation of REITs into the Spanish legislation has so far not allowed access to a sufficiently large sample of this type of institution to carry out empirical studies individually. The evidence obtained is consistent, in part, with the results achieved in other markets. In any case, the implications of this phenomenon in relation to the rational valuation of stocks, market efficiency, investors' behaviour and resource allocation warrant future research.

The remainder of the paper is organised as follows. Section 2 describes the arrival of REITs in Spain and the characteristics of the market analysed. Section 3 examines the empirical evidence of aftermarket performance in REITs. The theoretical framework and

hypotheses are described in section 4. Sections 5 and 6, respectively, describe the sample and the methodology used. The results obtained are shown in section 7 and section 8 concludes.

2. THE REIT MARKET IN SPAIN

The origin of Real Estate Investment Trusts (REITs) goes back to the 1960s in the United States. It was not until the beginning of the 21st century that they arrived in Europe and they have become progressively more firmly established in the Old Continent ever since. The adaptation of the real estate investment industry regulations in different countries in recent decades has promoted the growth of these trusts, increasing both their number and size. Figure 1 shows the composition of the REIT market in the world at the end of 2019 (EPRA, 2020).

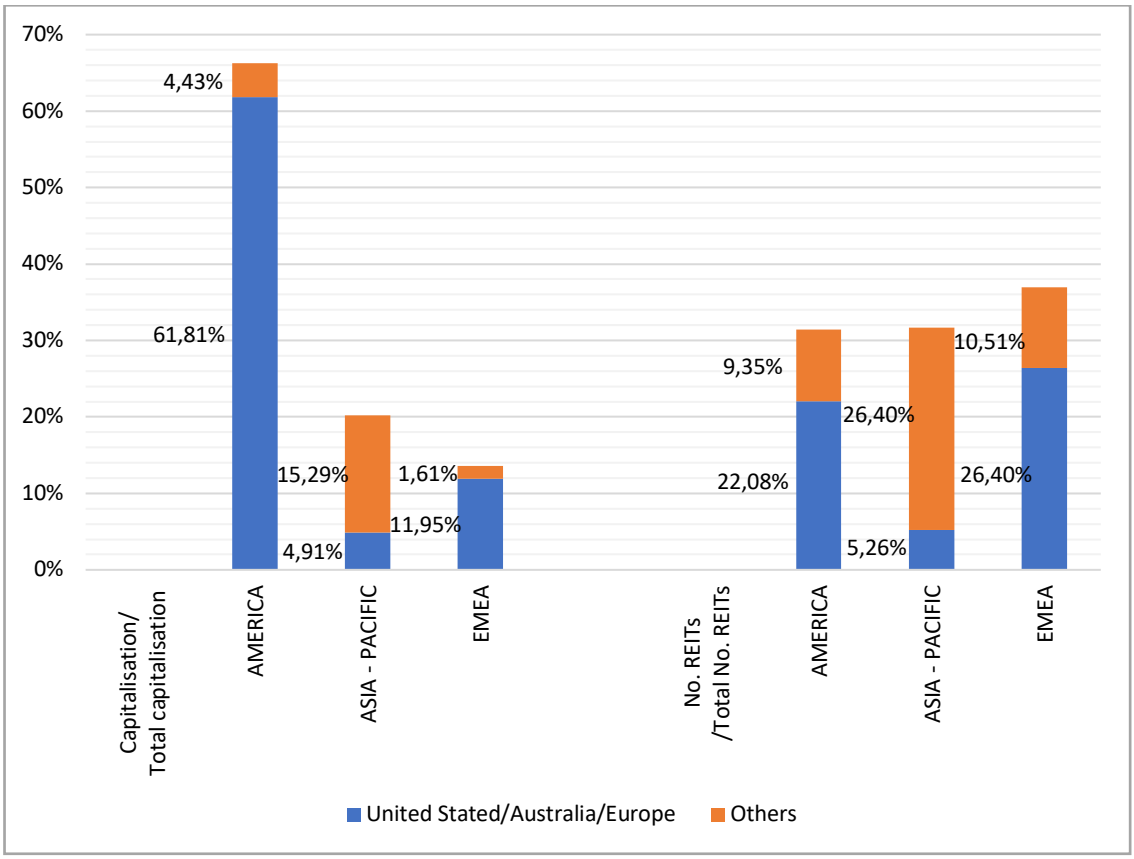

Figure 1. REIT markets around the world at the end of 2019.
Notes:
Europe includes European Union and Russian Federation.
EMEA includes Europe, Israel, South Africa, Turkey, United Arab Emirates and Saudi Arabia.
Source:
Own elaboration based on EPRA (2020).

Despite the fact that the arrival of the first REIT did not take place until the end of 2013, with the passing of Law 16/2012 (Reino de España, 2012),[4] Spain has a significant weight in Europe, as shown in Figure 2. In fact, in recent years (2017–2019) the number and size of these companies has increased significantly (see Figure 3), representing more than 75% of the listings on the Spanish stock market during that period.

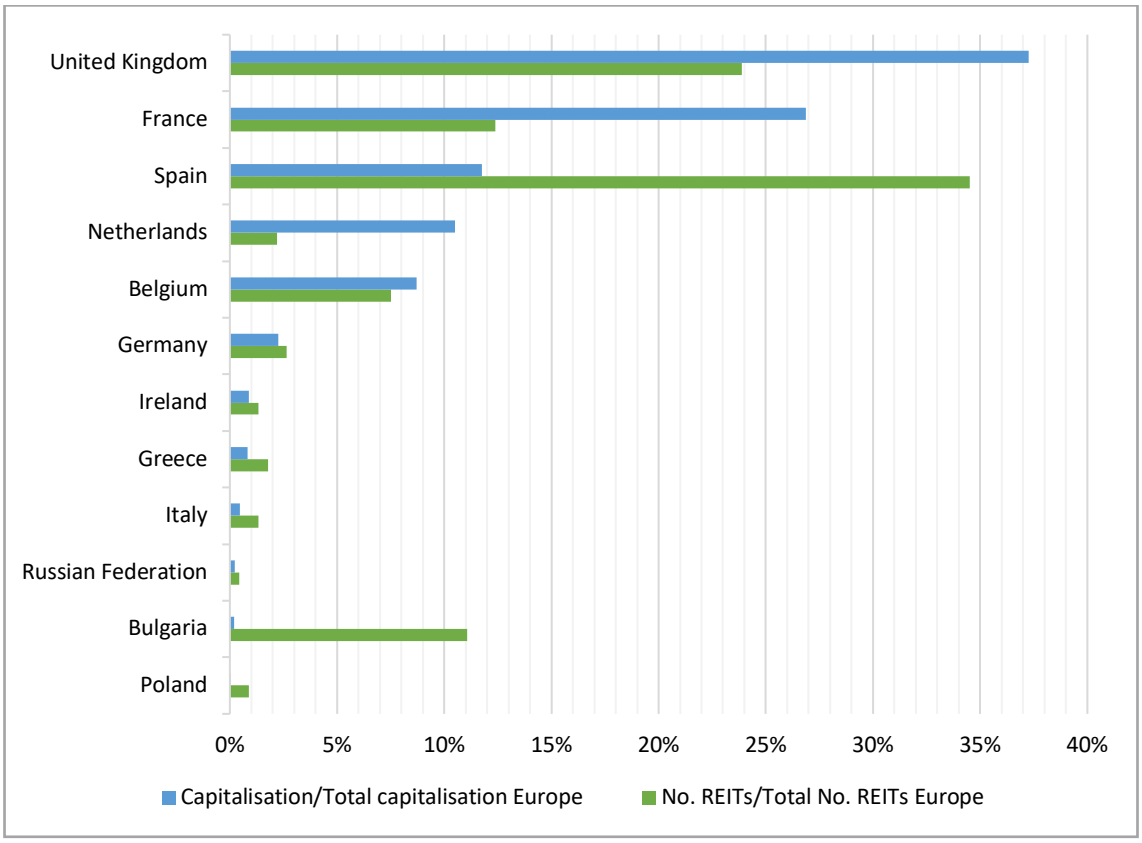

Figure 2. REIT markets in Europe at the end of 2019.
Source:
Own elaboration based on EPRA (2020).

[4] Law 16/2012 modified Law 11/2009 (Reino de España, 2009) and introduced flexibility, less restrictive conditions, and tax advantages for this type of companies. This law promoted the incorporation of these investment vehicles in Spain, making the Spanish real estate market more dynamic and providing real estate investments with liquidity.

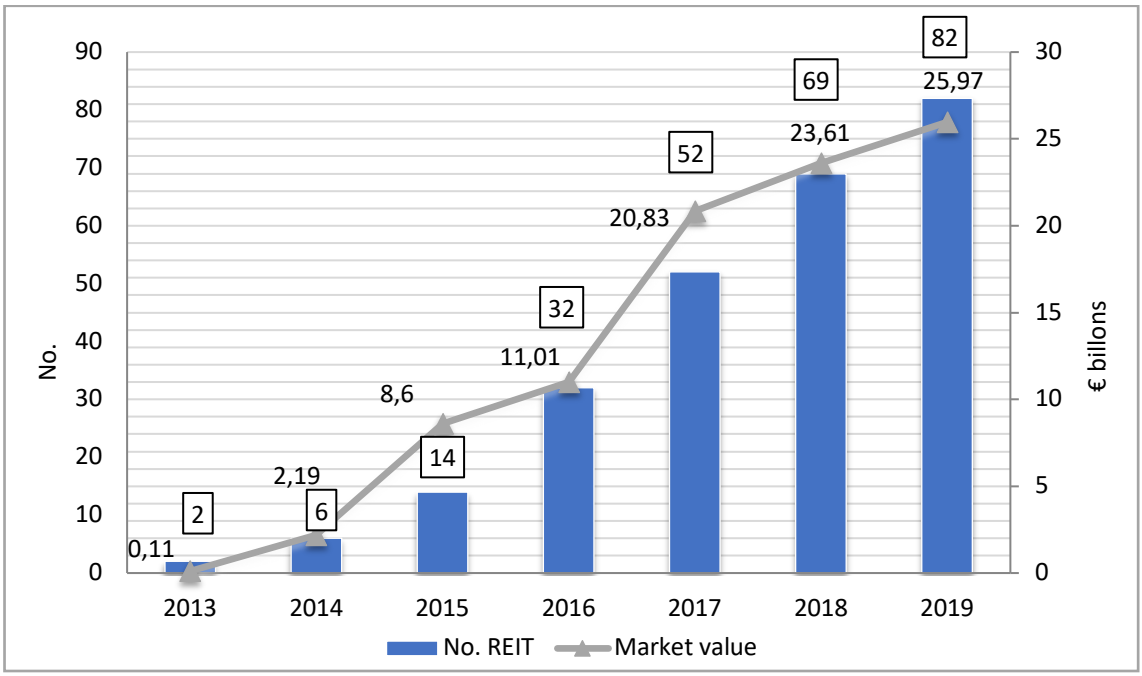

Figure 3. Time profile of REITs in the Spanish stock market during the period 2013-2019.

Source:
Own elaboration based on Bolsas y Mercados Españoles (2019).

With regard to the REIT market in Spain, it should be noted that most of the companies are admitted in a specific segment dedicated to REITs in the Spanish Alternative Stock Market (MAB), created in 2013. In this respect, at the end of 2019 only 4 of the 82 REITs admitted to the Spanish market were in the Spanish regulated market, more widely known as *Mercado Continuo* or SIBE. The MAB is a Multilateral Trading Facility (MTF) that has a far more flexible regulation than the *Mercado Continuo* in terms of admission and trading requirements, without foregoing an adequate level of transparency. Trading is mainly carried out multilaterally and electronically in the SIBE-SMART (the same electronic system as the one used in the *Mercado Continuo*) through a trading system called fixing, in which shares are auctioned throughout the session (from 8.30 am to 4.00 pm) with two price fixing and stock allotment times, at 12 noon and 4 pm (Bolsas y Mercados Españoles, 2017). Finally, in order to enter the market, there is no obligation to make an Initial Public Offering of shares (IPO) if, prior to entry, the minimum free floating capital requirement set out in Circular 2/2018 of the MAB is met

(Bolsas y Mercados Españoles, 2018).[5, 6] In this respect, one of the distinguishing features of this market compared to others is that, until now, all the REITs in this market have been incorporated by direct listing (DL). In these cases, the price taken as the initial price for admission (reference price) does not come from a placement, but is determined by the board of directors of the REIT based on the valuation of the company carried out by an independent expert (appraiser). In some cases, however, a private placement of shares occurs prior to listing for trading. If said placement complies with the requirements established in Circular 2/2018 of the MAB (Bolsas y Mercados Españoles, 2018), the reference price for the initial trading of the company's shares on the market will be the price of the aforementioned placement.

The market under study was only recently born and is still undergoing development. For this reason, despite the existence of the figure of the Liquidity Provider,[7] the MAB still has a reduced liquidity compared to other more mature markets. In order to shed light on this important question, and following Martínez et al. (2005), we have calculated an illiquidity proxy based on the measure proposed by Amihud (2002) (see expression (2) from section 6.1.1) both for the REIT sample and for the sample of control firms by size from the *Mercado Continuo* in the period under study (December 2013 to January 2020). The illiquidity ratio of both samples is significantly different from zero (Panel A of Table 1), the illiquidity ratio of REITs being significantly higher in mean and median than the illiquidity ratio of the matching firms from the *Mercado Continuo* (Panel B of Table 1). Therefore, the liquidity of the MAB segment for REITs is lower than for the *Mercado Continuo.*

[5] Minimum free floating capital condition: it shall be necessary for shareholders who hold less than 5% of the share capital of the company to hold a number of shares that corresponds to at least one of the following figures: i) an estimated market value of €2 million; or ii) 25% of the shares issued by the company.
[6] Article 35 of Royal Legislative Decree 4/2015, of 23 October, approving the consolidated text of the Spanish Securities Market Act, includes the definition of an initial public offering and secondary offerings.
[7] The main task of the Liquidity Provider is to favour the liquidity of transactions and achieve a sufficient liquidity frequency (Bolsas y Mercados Españoles, 2017). Its presence is mandatory for all REITs.

Table 1. Illiquidity of REIT sample and control firms by size from the *Mercado Continuo (MC)* during the period December 2013 to January 2020.

Panel A. Statistics	**ILLIQ. REIT**	**ILLIQ. CONTROL FIRM (MC)**
Mean	*** 3.589 [a]	*** 0.558 [a]
Median	1.611 [a]	0.348 [a]
Maximum	45.827	2.857
Minimum	0.000	0.002
Standard deviation	7.302	0.630
Sample size (N)	44	44
Panel B. Test of differences	**ILLIQ. REIT – ILLIQ. CONTROL FIRM (MC)**	
Mean differences	*** 3.031 [a]	
Median differences	1.262 [a]	

Notes:
ILLIQ. REIT: illiquidity proxy for the REIT sample estimated through the illiquidity ratio proposed by Amihud (2002). Data obtained according to expression (2) multiplied by one million.
ILLIQ. CONTROL FIRM (MC): illiquidity proxy of control firms by size from the *Mercado Continuo* estimated through the illiquidity ratio proposed by Amihud (2002). Data obtained according to expression (2) multiplied by one million.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.
[***, **, *] significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.
To test the mean, a parametric test based on the conventional *t* statistic is used. To compute the differences between the mean values, the *t* test is computed. Differences in medians are tested with the Kruskal-Wallis test.

3. EMPIRICAL EVIDENCE OF AFTERMARKET PERFORMANCE IN REITS

The aftermarket performance of the IPO share price (in either the long or the medium term) following the process of going public is one of the most interesting topics in the financial literature in recent years. Numerous studies have been conducted on almost all the capital markets around the world.[8]

However, in the case of REITs this phenomenon has been investigated separately from the rest of the companies, given the specific characteristics of these investment vehicles. Some differential characteristics of REITs are that (i) they invest in tangible

[8] See, for example, Gregoriou et al. (2006).

assets that can be rented so as to generate income; (ii) they are required to distribute most of their profit to their shareholders each year; and (iii) they have specific organisational structures and shareholder limitations; among others (Stevenson, 2013). The nature of REITs, as well as the regulatory restrictions to which they are subject, make them far more transparent than usual stocks (Below et al., 1995; Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997; Wang et al., 1992; Wong & Ong, 2013). This transparency makes it relatively easy for investors to value this sort of firms. Therefore, REITs can be considered a separate case of study. Today, there is a significant volume of studies evaluating the performance of REITs. In Table 2 we provide a summary of the evidence on the aftermarket performance of IPO REITs and property firms from selected studies whose methodology is similar to that used in the present study. As we can observe, most of them refer to the North America market (US and Canadian stock markets). To date, only a handful of studies have examined the performance of REIT IPOs in countries outside the USA. In Europe, although some studies have been conducted in the real estate sector, the late popularisation of REITs means that, to date, studies addressing them are practically inexistent.

Evidence on performance of real estate after going public is mixed, even contradictory. It depends on the period of time studied, the country, and the method used to calculate the returns. As shown in Table 2, the results are very diverse, ranging from a negative mean return of -24.70% using the market adjusted BHAR methodology over a post-listing five-year period for a sample of 90 REITs in the US market over the period 1991–2008 (Joel-Carbonell & Rottke, 2009) to a positive mean performance of 22.16% with the market adjusted BHAR methodology over a post-listing 12-month period for a sample of 13 IPOs carried out by property firms in the Sweden market over the period 1984–1999 (Brounen & Eichholtz, 2002). If we do not include the real estate companies, the positive average return of REITs is 8.34% for the 20-day period analysed in Canada by Londerville (2002) or 2.22% for a longer period of 3 years studied by Ooi et al. (2018) in the Asian market. Therefore, evidence on the aftermarket performance is still inconclusive.

Table 2. Summary of aftermarket performance of REITs and property firms from selected studies.

	Country	Sample size and type	Sample period	Methodology	Abnormal returns (%) and period
Global					
Chan et al. (2013)	Global	370 REITs	1996-2010	Market-adjusted CAR	1.32** (Days 1-30) -1.99*** (Days 2-30) -0.76 (Days 1-90) -4.07*** (Days 2-90) -4.05*** (Days 1-190) -7.36*** (Days 2-190)
North America					
Wang et al. (1992)	US	87 REITs	1971-1988	Matching REIT-adjusted CAR	-10.11** (Days 1-190) -7.48* (Days 2-190)
Ling & Ryngaert (1997)	US	85 REITs	1991-1994	Market-adjusted BHAR	2.20* (Days 1-100)
Londerville (2002)	Canada	13 REITs	1993-1998	Market-adjusted CAR	8.34** (Days 1-20)
Joel-Carbonell & Rottke (2009)	US	90 REITs	1991-2008	Market adjusted BHAR	-4.10 (one year) -8.30 (three years) -24.70** (five years)
Dimovski et al. (2017)	US	56 REITs	2010-2015	Market adjusted total return Market adjusted dividend yield	-2.18 (6 months) 4.23 (12 months) 0.88*** (6 months) 1.90*** (12 months)

Table 2. cont.

	Country	Sample size and type	Sample period	Methodology	Abnormal returns (%) and period
Asia-Pacific					
Chan et al. (2001)	Hong Kong	56 PROP	1986-1997	Market-adjusted CAR	-4.73* (Days 2-60) -9.62** (Days 2-60) -8.92 (Days 2-200)
Ooi et al. (2018)	Japan, Hong Kong, Singapore and Malaysia	107 REITs	2001-2013	Market-adjusted BHAR	1.31 (100 days) -0.35 (one year) 2.22 (three years)
Europe					
Brounen & Eichholtz (2002)	France	17 PROP	1984-1999	Market adjusted CAR Market adjusted BHAR	-12.62** (12 months) 10.76** (12 months)
Brounen & Eichholtz (2002)	Sweden	13 PROP	1984-1999	Market adjusted CAR Market adjusted BHAR	18.89 (12 months) 22.16* (12 months)
Brounen & Eichholtz (2002)	UK	24 PROP	1984-1999	Market adjusted CAR Market adjusted BHAR	-4.53 (12 months) -5.83 (12 months)

Notes:
PROP: property firms or Real Estate Operating Company (REOC).
CAR: cumulated abnormal returns.
BHAR: abnormal buy-and-hold returns.
***, **, * significant at the 1%, 5% and 10% levels, respectively

With regard to the Spanish market, some papers have studied the long-term performance of non-REIT companies that carried out an initial public offering of shares. Álvarez & González (2005), Farinós (2001) and Farinós et al. (2007a, 2007b) did not find that firms underperform in the year following the IPO. Their results showed that only seasoned equity issues (SEO) driven by private medium-sized and small firms with low market-to-book ratios experience economically and statistically significant

underperformance during the year after the issue. As far as we know, there are no studies that have analysed the aftermarket performance of REITs in Spain when going public. The reduced sample available until now, because of the recent creation of this investment vehicle in Spain, has prevented this sort of studies from being conducted

4. THEORETICAL FRAMEWORK AND HYPOTHESES

There is a significant body of academic literature on long-term underperformance after going public. However, there is also evidence of not underperformance after going public when firms select direct listing (Alhashel, 2018). In the case of REITs, as we stated in the previous section, there is no consensus on the aftermarket performance after their IPO, as it depends on various factors. This inconclusive evidence, together with the special characteristics of the going public and the market under analysis, and the lack of previous evidence of this phenomenon in the Spanish REIT market, encourages us to study it and to explore whether abnormal performance after listing exists.

If we analyse the theories that attempt to explain the abnormal performance after going public, we observe that the more classical part is based on market efficiency. Thus, Fama (1998) argued that the abnormal long-term performance detected is the result of biased methodologies and/or poorly specified valuation models. Brav et al. (2000) and Mitchell & Stafford (2000), among others, detected that long-term anomalies are sensitive to the methodology used, which would reinforce the argument that this anomaly is not evidence against market efficiency. Loughran & Ritter (2000) argued that if the market really does not value securities adequately, then abnormal returns should not be robust to alternative methodologies. Furthermore, these authors criticised the fact that proxies related to poor valuation rather than true risk factors were included as references on a widespread basis, as they bias their contrasts against the detection of abnormal returns. Eckbo et al. (2000) and Eckbo & Norli (2005) proposed a rational interpretation of abnormal returns after the event that is related to a change in risk.

Part of the literature questions the efficiency of the market and attributes the anomalies observed to irrational investors suffering from different cognitive biases (Barberis et al., 1998; Daniel et al., 1998). Alternatively they are ascribed to rational investors immersed in a context of asymmetric information in relation to the issuing

companies, with the hypothesis of windows of opportunity being more predictable in the literature (Loughran & Ritter, 1995; Ritter, 1991).

The windows of opportunity assumption require, in addition to the incorrect valuation of the company by investors, some additional circumstance to explain the slow price adjustment, such as certain obstacles that prevent the rapid adjustment of prices. Thus, in a frictionless market, arbitrageurs eliminate all pricing deviations, but with non-zero market friction, mispricing can persist because of the existence of barriers to institutional investors or different arbitrage costs as higher bid–ask spreads (Hensler, 1998; Loughran & Ritter, 2004).

As we show in section 2, one key characteristic of the Spanish REITs market is its reduced liquidity, which prevents institutional investors from entering. Following Hensler (1998) and Loughran & Ritter (2000), the existence of this sort of obstacles would explain why mispricing, if it exists, may persist over time.

As our results show the existence of an underperformance following the listing of REITs on the stock exchange in Spain, we have selected a series of variables and put forward some hypotheses to be tested on the firm, flotation and market characteristics that may be related with the existence of post-flotation abnormal returns. These variables and hypotheses have been selected within the context of the different existing post-performance theories and are designed to cover the specific characteristics of this type of investment vehicle and the peculiarities of the market where they are listed.

Within the theories of information asymmetry, and following Beatty and Ritter (1986), we assume that the greater the ex-ante uncertainty about the value of the company is the worse the aftermarket performance will be. The approaches to the ex-ante uncertainty that we propose, which have to do with the characteristics of the issuing company and are commonly used in the literature, are size and age. In general, it is considered that there is greater uncertainty in small and younger companies (Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997). Therefore, we formulate the following hypotheses:

> ***H1.*** *The larger the size the issuing company is, the better the aftermarket performance will be.*

H2. *The older the company is, the better the expected aftermarket performance will be.*

We have also taken into account the level of leverage as a measure of ex ante uncertainty. Following Ling & Ryngaert (1997), Brounen & Eichholtz (2002) argued that the higher a company's level of leverage is, the fewer opportunities for growth there will be and therefore it will be easier to value it. Likewise, the higher the level of leverage is, the more supervision or monitoring there will be (Álvarez, 2001). Based on the above, we propose the following hypothesis:

H3*. The higher the company's level of leverage is, the better the aftermarket performance will be.*

Continuing with the monitoring hypothesis and assuming that the higher the percentage of shares held by executives is, the lower the external monitoring will be (Wu, 2004), we propose the following hypothesis:

H4. *The higher the percentage of shares retained by shareholders in executive positions is, the worse the aftermarket performance will be.*

If we take into account the initial-day return, the literature is inconclusive. On the one hand, many researchers (Bradley et al., 2009; Hanley, 1993; Omran, 2005; Ritter, 1991) have found a negative relation between this variable and abnormal long-run returns. According to the overreaction explanation, investors are optimistic about the expected performance and overprice stocks when the firm goes public, and this gives rise to a high positive return at the time of the IPO. However, this mispricing would be revealed in the future and the abnormal long-term return would be negative. Nevertheless, other studies (Álvarez & González, 2005; Grinblatt & Hwang, 1989; Michaely & Shaw, 1994), based on the idea that underpricing reflects the quality of the company (signalling hypothesis) and its ability to issue shares at market prices in subsequent offerings, have reported a positive relation between this variable and long-run abnormal returns. Therefore, in keeping with the overreaction explanation we formulate the following hypothesis:

H5.a. *The higher the adjusted initial day return of the REIT is, the worse the aftermarket performance will be.*

However, based on the signalling theory, the hypothesis that we propose is the following:

> ***H5.b.*** *The higher the adjusted initial day return of the REIT is, the better the aftermarket performance will be.*

We formulate the following hypothesis based on the "fads" explanation. Ritter (1991) suggested that the low abnormal long-run returns of IPOs are caused by many firms simultaneously going public in hot sectors and implies that investors can be periodically overoptimistic as regards the potential profits of new firms. However, this mispricing would be revealed in the future and the abnormal long-term return would be negative. Following Ascherl & Schaefers (2018), Brobert (2016) and Buttimer et al. (2005), we have considered whether listing takes place in a period of hot (cold) market when there have been ten or more (fewer) flotations in the year the REIT was launched on the market. Therefore, we test the following hypothesis:

> ***H6.*** *Aftermarket performance will be worse when the listing occurs during a hot market.*

Finally, we have included a series of hypotheses regarding the characteristics of REITs and the peculiarities of the market in which they are listed.

In relation to the property strategy followed by REITs, Brounen & Eichholtz (2002) and Eichholtz et al. (2000) found that REITs with a diversified property strategy have a worse post-flotation abnormal return than those that follow a specialised strategy.[9] It is possible that the aftermarket performance is negative if the market needs time to decide on the true value of the property, and REITs with a diversified property strategy are more difficult to value. Accordingly, we propose the following hypothesis:

> ***H7****. The aftermarket performance is worse when the property strategy is diversified.*

Chan et al. (2013), based on the well documented shift in US equity REITs from being externally managed to internally managed in the late 1980s, found evidence that this change in the management structure of REITs has a positive effect on long-term

[9] See Capozza & Seguin (1999) for the relationship between focus and firm value in REITs.

performance. Thus, following Chan et al. (2013), better performance is expected in internally managed REITs than in the case of those with external management. Hence:

> ***H8**. Aftermarket performance is better when the management of the company is internal.*

In the framework of the theoretical model put forward by Chemmanur & Fulghieri (1999), we assume that companies that have made a private placement have less information asymmetry than those that have not done so.[10] Also, investors would interpret a successful previous private placement (PPP) as a valuable signal of the REIT quality in their pricing decisions (certification role played by PPP investors) (Cai et al., 2011; Hertzel & Smith, 1993). Furthermore, following the monitoring hypothesis, we expect that PPP could improve monitoring of the management of the REITs (Wu, 2004). Thus, we formulate the following hypothesis:

> ***H9**. REITs that perform a previous private placement of shares will show better aftermarket performance than REITs that do not.*

Finally, we examine the possible effects on long-term performance of setting the initial share price above its fundamental value (Hanley, 1993; Ooi et al., 2018). Assuming that the more the price is separated from its fundamental value at the time of listing, the higher the subsequent adjustment will be, we propose the following hypothesis:

> ***H10.** The aftermarket performance is worse when the reference price is higher than the price determined by the appraiser.*

5. SAMPLE

Our initial sample consisted of all the REITs that had been listed on the Spanish Alternative Stock Market (MAB) since the creation of their own particular REIT segment on 15 February 2013 up until 31 January 2020.[11] During this period, there have been 88 admissions. We analyse the aftermarket performance of REIT admissions using three

[10] See Acedo-Ramírez & Ruiz-Cabestre (2019) to see how the specific characteristics of the Spanish IPO market influence the level of ex-ante asymmetric information.
[11] To carry out the study, the four REITs of the Spanish *Mercado Continuo* (which is a regulated market) have not been included in the sample so that the results are not distorted by differences in the characteristics and regulation of this market and the MAB (see section 2).

windows: 6-, 12- and 24-month post-admission windows.[12] To assess our aftermarket performance study, only those admissions that have a complete 24-month window have been taken into consideration. Besides, we have discarded those companies that have not traded in this period or have only traded block trading, as the latter is not considered an official closing price.[13] Imposing these requirements resulted in a sample of 44 REITs.

Data on market admissions, financial information and other information about the REITs were hand-collected from the Informational Document on Admission to the Market (IDAM) and the relevant facts available on the MAB website. Information on SIBE companies has been obtained from the Thomson Reuters Datastream database. The stock market data are from the Bolsas y Mercados Españoles Group, with the exception of the SIBE companies and FTSE EPRA/NAREIT Spain index, which was obtained from the Thomson Reuters Datastream database.

6. METHODOLOGY

6.1. POST-FLOTATION ABNORMAL RETURN ESTIMATION

We used two event time method approaches generally employed in the literature, as we have seen in section 3, for estimating abnormal returns: (i) compounding monthly returns (buy-and-hold abnormal return, BHAR), and (ii) adding monthly returns (cumulative average abnormal return, CAR). Next, we introduce the references (controls) used for the generation of the abnormal performance in those approaches.

6.1.1. References used to estimate the post-flotation abnormal return of REITs

To measure abnormal performance, we used various references divided into three groups. The first group is related to market indexes. We selected the Madrid Stock Exchange General Index (IGBM), indicative of the general performance of the Spanish market; the IBEX Small Cap (SMALL), indicative of the performance of the medium-

[12] All the windows begin in the natural month following the admission.
[13] Block trading is a system designed to allow members to apply cross opposite-side orders or carry out bilateral trades, provided that they meet the volume requirements established for gaining access to block trading conditions.

sized and small companies on the Spanish market (similar size to the Spanish REITs); and the FTSE EPRA/NAREIT Spain (EPRA or EPRA NAREIT), indicative of the specific performance of REITs on the Spanish stock market. Second, we used a control firm procedure by matching the listed REITs with firms according to size and liquidity characteristics, based on the illiquidity ratio proposed by Amihud (2002).[14] We employed the illiquidity ratio instead of the book-to-market ratio given the characteristics of the MAB (see section 2). Amihud's (2002) illiquidity ratio was computed as in Martínez et al. (2005). Thus, we first calculated the illiquidity ratio of firm i in month t ($ILIQ_{it}$) as shown in expression (1).

$$ILIQ_{it} = \frac{1}{Days_{it}} \sum_{d=1}^{Days_{it}} \frac{|R_{itd}|}{V_{itd}}, \quad (1)$$

where R_{itd} and V_{itd} are, respectively, the return and the volume (in euros) of company i on day d of month t, and *Days* represents the number of days that firm i has traded in month *t.* In order to obtain the illiquidity ratio for a portfolio (or even the whole market) in month *t*, we computed the average illiquidity ratio as in expression (2).

$$ILIQ_t = \frac{1}{N} \sum_{i=1}^{N} ILIQ_{it}, \quad (2)$$

where N is the number of firms available in the portfolio (or market) in each month *t*.

We identified all the firms from the *Mercado Continuo* and the MAB (in the growth companies' segment) that had not carried out an admission in the previous 6, 12 or 24 months (depending on the window analysed) and selected the one whose size (illiquidity ratio) was the closest to that of the sample firm. In addition, we imposed two further requirements: first, we required that the selected company does not leave the market during the 6 (12, 24) months following the date of issue since the match was maintained throughout the period of study; and second, the selected control company could not be reassigned to a sample company until the window under study ends.

Finally, we matched each REIT with a portfolio according to size and liquidity characteristics. Specifically, from the whole Spanish *Mercado Continuo*, we formed ten

[14] To identify a matched control firm, we followed Barber & Lyon (1997) and Lyon et al. (1999).

portfolios on the basis of size and ten portfolios on the basis of the illiquidity ratio. We followed the matching procedure of Fama & French (1993) to ensure that each REIT was placed in the appropriate portfolio. To avoid the problem of portfolio contamination discussed in Loughran & Ritter (2000), firms that had made a listing in the previous 6 (12, 24) months were not included in the portfolio (Brav et al., 2000; Brav & Gompers, 1997).

6.1.2. Computing buy-and-hold abnormal returns (BHAR)

First, we calculated the return obtained through a buy-and-hold strategy for REIT i during investment period τ (6, 12 and 24 months, respectively), that is, $BHR_{i\tau}$. This was calculated by composing its monthly return from the month following the admission (s) until the end of the horizon considered (s+τ) in accordance with expression (3).

$$BHR_{i\tau} = [\prod_{t=s}^{s+\tau}(1 + R_{it})] - 1, \quad (3)$$

where R_{it} is the return of company i from the sample in month t.

The abnormal buy-and-hold return of REIT i ($BHAR_{i\tau}$) was computed as in expression (4).

$$BHAR_{i\tau} = BHR_{i\tau} - BHR_{CONTROL,\tau}, \quad (4)$$

where $BHR_{CONTROL,\tau}$ is the monthly buy-and-hold return of the control (see section 6.1.1) for the window of τ months.[15] A positive $BHAR_{i\tau}$ indicates better performance of the admission REIT as compared to the benchmark.

The null hypothesis to be tested was that the mean of the cross-section of the abnormal buy-and-hold return ($\overline{BHAR_{\tau}}$) was equal to zero. We tested the null hypothesis through the standard *t* statistic controlling for heteroskedasticity using White's (1980) method.

One aspect that still remains unsolved in the literature concerns the poor specification of the statistical contrast of the previous null hypothesis (Barber & Lyon,

[15] The BHR corresponding to the control or references was calculated in an analogous way to expression (3).

1997; Lyon et al., 1999; Mitchell & Stafford, 2000). For this reason, in order to make our results more robust, we employ the Cowan & Sergeant (2001) methodology in expression (5).

$$Z = \frac{\overline{BHAR}}{\sqrt{\frac{\hat{\sigma}^2 SAMPLE}{N} + \frac{\hat{\sigma}^2 CONTROL}{N}}}. \quad (5)$$

6.1.3. Computing cumulative average abnormal returns (CAR)

We have calculated the *CAR* in two alternative ways. On the one hand, we have calculated *CARs* similar to the *BHARs* in section 6.1.2. Thus, we calculated the abnormal return for REIT i for every month *t* during the investment period of τ months (τ being 6, 12 and 24 months, respectively) since the first calendar month *s* after the listing date (AR_{it}) by computing the difference between the return of REIT i in month *t* and the return corresponding to each of the references selected in section 6.1.1 in the same month *t.* We then computed the cumulative abnormal return for REIT i in the post-listing period τ ($CAR_{i\tau}$) as in expression (6).

$$CAR_{i\tau} = \sum_{t=s}^{s+\tau} AR_{it}. \quad (6)$$

We tested the null hypothesis that the cross-section cumulative average abnormal return ($\overline{CAR}_\tau$) was equal to zero using the conventional *t* statistic. Moreover, we employed the Cowan & Sergeant (2001) methodology in expression (7).

$$Z = \frac{\overline{CAR}}{\sqrt{\frac{\hat{\sigma}^2 SAMPLE}{N} + \frac{\hat{\sigma}^2 CONTROL}{N}}}. \quad (7)$$

On the other hand, and in order to follow the progressive aftermarket performance of REITs, we computed the cumulative abnormal return in the post-listing period of τ months for the sample of REITs (CAR_τ) by accumulating the average abnormal cross-sectional return in each month *t* after the REIT admission ($\overline{AR}_t$), as in expression (8).

$$CAR_\tau = \sum_{t=s}^{s+\tau} \overline{AR}_t\ , \quad (8)$$

where the average abnormal cross-sectional return ($\overline{AR_t}$) is computed as shown in expression (9).

$$\overline{AR_t} = \frac{1}{N}\sum_{i=1}^{N} AR_{it}\ , \tag{9}$$

where AR_{it} is the abnormal return of firm i in month *t* after the event, computed as the difference between the return of the REIT and the return corresponding to each of the references selected in section 6.1.1.

Here, we tested two hypotheses. First, we tested the null hypothesis that the average abnormal return ($\overline{AR_t}$) in each month *t* after the listing was significantly different from zero. To test this null hypothesis, we used the conventional t statistic.

Second, we tested whether the cumulated abnormal return for the window of τ months after the listing (CAR_τ) was significantly different from zero. We corrected the cross-sectional correlation problem as shown in expression (10).

$$t = \frac{CAR_\tau}{\sqrt{(\tau \cdot [\sum_{t=s}^{\tau}\left(\overline{AR_t} - \frac{1}{\tau}\sum_{t=1}^{\tau}\overline{AR_t}\right)^2]/(\tau - 1)}}\ . \tag{10}$$

This statistic is a variant proposed by Espenlaub et al. (2000) of the procedure that Brown & Warner (1980) called the Crude Dependence Adjustment test, with which it is possible to correct the cross-sectional correlation problem.

6.2. FIRM, FLOTATION AND MARKET CHARACTERISTICS ANALYSIS

The definitions of the explanatory variables selected to test the hypotheses set out in section 4 are shown in Table A1. Table 3 offers a summary of the main characteristics of these explanatory variables.

In order to test the different hypotheses, we carried out both a univariate and a multivariate analysis. In the univariate analysis, we split the sample, except for the dummy variables, into two subgroups per variable, taking the median as the cut-off point. The null hypothesis to be tested was that the mean (median) of the returns of each

subgroup was equal to zero. To test the mean, we used a parametric test based on the conventional *t* statistic. In addition, in order to make our results more robust, we employed the bootstrap methodology (Efron, 1982; Wehrens et al., 2000). With regard to the median, we use the Wilcoxon signed rank test. To test the differences in the mean values between subgroups we performed the parametric *t* test and applied the bootstrap methodology. The difference in the medians between subgroups was tested using the Kruskal-Wallis test.

Table 3. Descriptive statistics of the explanatory variables.

	N	Mean	Std. dev.	Min.	Median	Max.
SIZE (million €)	44	143.60	328.30	5.91	52.02	2,054.00
AGE (years)	44	6.95	9.78	0.19	2.31	42.27
DEBT (%)	44	37.40	30.30	0.00	33.90	104.80 (1)
EXECUTIVES (%)	44	46.26	41.28	0.00	45.16	100.00
AR (%)	44	2.40	5.10	-2.80	1.20	26.30
***Dummy* variables**	**Total Dummy**	**Dummy 0**	***Dummy 0 / Total Dummy (%)***	**Dummy 1**	***Dummy 1 / Total Dummy (%)***	
MARKET	44	11	25.00	33	75.00	
PROPERTY	44	31	70.45	13	29.55	
MANAGEMENT	44	34	77.27	10	22.73	
PPP	44	33	75.00	11	25.00	
REFERENCE PRICE	39	21	53.85	18	46.15	

Notes:
The variables are described in Table A1.
N: sample size.
(1) This data corresponds to a newly incorporated REIT whose main assets were from a recently acquired company with a debt ratio of 75%. At the time of going public the REIT did not have consolidated accounts.

In order to check the robustness of the results from the univariate analysis, we carried out a multivariate analysis through several multiple regression models in accordance with expression (11) for the longest window studied.

$$AP_{i24} = \alpha + \sum_{j=1}^{m} \beta_j \ X_{ij} + \varepsilon, \qquad (11)$$

where AP_{i24} is the REIT$_i$ aftermarket performance measured by both $BHAR_{i24}$ and CAR_{i24}, and X_{ij} is the set of independent variables that correspond to the selected explanatory variables shown in Table A1.

For the purpose of minimising the influence of extreme values on expression (11), the natural logarithms of the variables SIZE (LNSIZE), AGE (LNAGE) and DEBT (LN (1+DEBT)) have been used (Brobert, 2016; Brounen & Eichholtz, 2002; Ling & Ryngaert, 1997).

Each model in expression (11) has been estimated by cross-sectional Ordinary Least Squares (OLS), applying the methodology proposed by White (1980) to obtain a robust estimation of the parameters in the presence of heteroscedasticity. As we have a small sample size, we have also estimated the significance of the parameters through the bootstrap procedure (Fox, 2008). For the same reason, we have not included more than six explanatory variables in the same model in order to preserve enough degrees of freedom, and so we have designed five different models. To analyse the absence of multicollinearity among the regressors, we used Spearman's Rho correlation coefficient among the different variables of each model. We have also used the Variance Inflation Factor (VIF).

7. RESULTS

7.1. AFTERMARKET ABNORMAL RETURNS

Table 4 shows the abnormal returns for our REIT sample during the 6-month, 12-month and 24-month windows following the listing, respectively, employing both the buy-and-hold and cumulative return methodology. Results obtained with both methodologies are similar. In general, we find significant abnormal underperformance during the 6 and 12 months after the listing that extends until 24 months when we match REITs with either market indexes or portfolios based on some characteristic (i.e., size, illiquidity or industry). In these cases, we find significant abnormal returns that range from -8% to -17% during the 6 months after the listing (Panel A from Table 4) and between -8.5% and -19% for the 12 months following the event (Panel B from Table 4). When we extend the window under study to 24 months, we find significant abnormal returns that range from -9% to -34% (Panel C from Table 4).

Table 4. Buy-and-hold abnormal return (BHAR) and cumulative abnormal return (CAR) calculated for an equally weighted portfolio during a 6-, 12- and 24-month post-REIT admission window.

	N	BHAR (%)	t test p-value	Z test p-value	CAR (%)	t test p-value	Z test p-value
Panel A: 6-month post-listing window							
IGBM	44	-2.959	0.259	0.129	-3.287	0.272	0.121
SMALL	44	-12.294	0.000	0.000	-12.116	0.000	0.000
EPRA NAREIT	44	-9.102	0.001	0.000	-9.646	0.002	0.000
Firm size control	44	-4.891	0.423	0.296	-3.476	0.523	0.231
Firm illiquidity control	44	-3.893	0.327	0.125	-4.310	0.325	0.129
Size portfolio	44	-16.905	0.000	0.000	-15.078	0.001	0.000
Illiquidity portfolio	44	-8.130	0.009	0.008	-7.867	0.015	0.006
Panel B: 12-month post-listing window							
IGBM	44	-2.050	0.515	0.339	-1.232	0.718	0.329
SMALL	44	-16.117	0.000	0.000	-14.343	0.000	0.000
EPRA NAREIT	44	-10.882	0.000	0.000	-10.403	0.001	0.000
Firm size control	44	-4.893	0.526	0.344	-2.981	0.698	0.349
Firm illiquidity control	44	-0.651	0.890	0.402	-1.158	0.821	0.375
Size portfolio	44	-18.867	0.000	0.000	-17.279	0.001	0.000
Illiquidity portfolio	44	-9.838	0.011	0.011	-8.538	0.031	0.003
Panel C: 24-month post-listing window							
IGBM	44	5.535	0.144	0.031	4.568	0.263	0.048
SMALL	44	-23.451	0.000	0.000	-19.913	0.000	0.000
EPRA NAREIT	44	-19.340	0.000	0.000	-18.008	0.000	0.000
Firm size control	44	-2.667	0.813	0.469	2.470	0.814	0.402
Firm illiquidity control	44	-1.326	0.860	0.461	-0.648	0.929	0.457
Size portfolio	44	-33.835	0.000	0.000	-30.321	0.000	0.000
Illiquidity portfolio	44	-10.377	0.066	0.035	-8.712	0.088	0.024

Notes:
N: sample size.
BHAR: equally weighted average cross-sectional buy-and-hold abnormal return. Controls or references are defined in section 6.1.1.
CAR: equally weighted average cross-sectional cumulative abnormal return. Controls or references are defined in section 6.1.1.
t: t statistic corrected by heteroscedasticity using White's (1980) methodology.
Z: statistic proposed by Cowan & Sergeant (2001). See expression (5) and (7). The returns for the sample and controls have been winsorised at the three standard deviations.

When a board market index (IGBM) and firm size and firm illiquidity controls are used, BHARs and CARs during the 6, 12 and 24 months after listing are not significantly different from zero.[16] Although Lyon et al. (1999) suggested that a control firm matched for characteristics produces well-specified statistical tests, some authors disapprove of its use (Brav et al., 2000; Brav & Gompers, 1997; Eckbo et al., 2000; Jegadeesh, 2000). Stehle et al. (2000) found that for studies with a small number of observations (like the present study) it is more appropriate to use a control portfolio than a control firm. Regarding the use of a broad market index (the IGBM), our results may be the consequence of the great difference in terms of liquidity between the components of this market index and the companies in the sample analysed, which causes asynchronies in the trading.

In order to see the time profile of the abnormal returns, Table 5 shows the CAR from the first calendar month after the listing up to month 24. Results from Table 5 are similar to those found in Table 4. In brief, our results suggest a statistically significant underperformance during the 24 months after going public, except when we adjust REIT returns for firm size and firm illiquidity controls, finding that CARs are not significant in most months. When REIT returns are adjusted for the IGBM control, we find some non-significant months.

Figure 4 shows the CAR for the SMALL, EPRA NAREIT and size and illiquidity portfolio references from Table 5. Interestingly, the REITs' performance undergoes a worsening during the first ten months after their listing. This leads them to accumulate an underperformance that goes from -10.66% to -18.96% depending on the control, to then improve slightly in the 11th and 12th and then worsen again (except for the illiquidity portfolio reference) until the end of the study horizon of 24 months.[17]

The significant post-listing stock price underperformance reveals, together with the evidence of positive and significant adjusted initial returns found by Castaño et al. (2020), that Spanish REITs were overpriced when they went public.

[16] We obtain significant positive abnormal returns with the IGBM reference when we use the statistic proposed by Cowan & Sergeant (2001) in Panel C from Table 4.

[17] The possible reason for this improvement in the 11th and 12th months is that until August 2017 REITs could be incorporated without the minimum free float required by the regulations (see section 2) with the commitment to disseminate the capital within one year as of their admission.

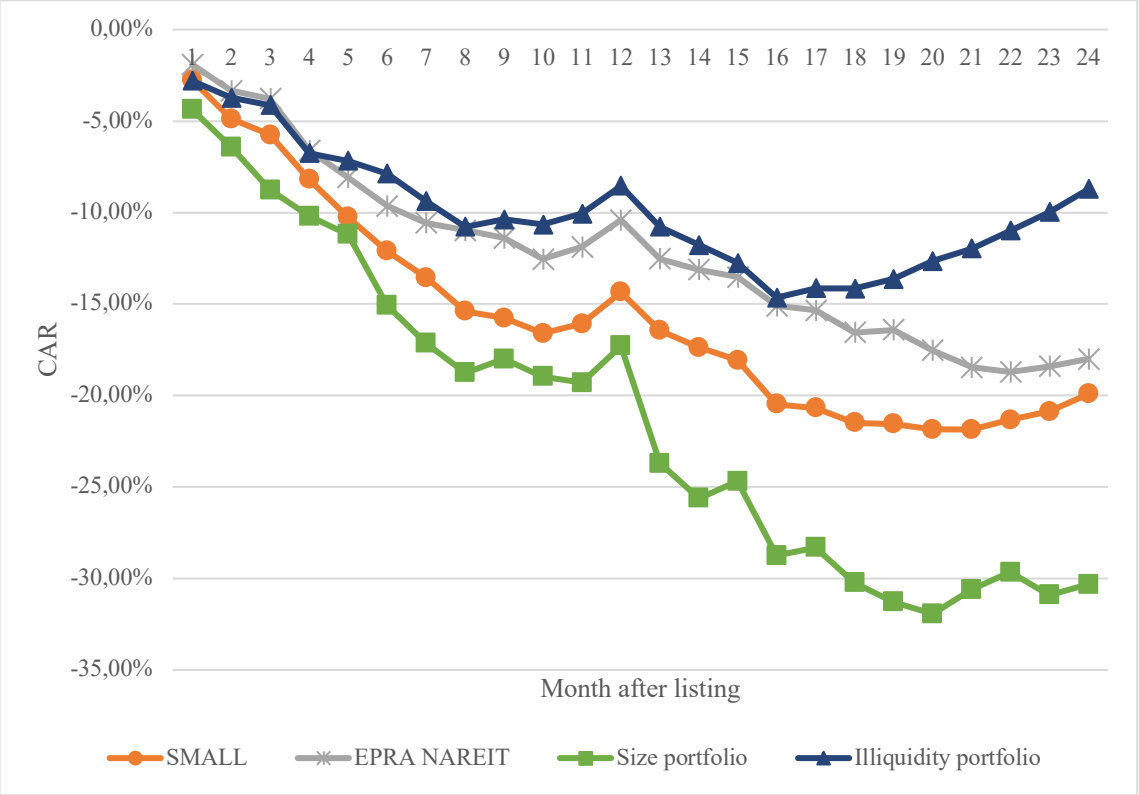

Figure 4. After REIT listing cumulative average abnormal returns (*CAR*) for an equally weighted portfolio.

7.2. UNDERPERFORMANCE AND FIRM, FLOTATION AND MARKET CHARACTERISTICS ANALYSIS

In the univariate analysis, the relationship among various firm, flotation and market characteristics described in section 4 and Table A1 with 6-, 12- and 24-month buy-and-hold abnormal returns (BHAR) is examined in Table 6. The results are similar when the cumulative abnormal return (CAR) methodology is used.[18]

[18] The results can be obtained from the authors on request.

Table 5. Cumulative average abnormal return (*CAR*) calculated for an equally weighted portfolio up to 24-month post-REIT admission window.

MONTH	N	IGBM (%)	p-value	SMALL (%)	p-value	EPRA NAREIT (%)	p-value	Firm size control (%)	p-value	Firm illiquidity control (%)	p-value	Size portfolio (%)	p-value	Illiquidity portfolio (%)	p-value
1	44	-1.657	0.032	-2.769	0.001	-1.912	0.013	0.004	0.998	-2.768	0.046	-4.382	0.001	-2.805	0.002
2	44	-2.260	0.024	-4.887	0.000	-3.348	0.000	-1.293	0.386	-1.382	0.293	-6.428	0.000	-3.723	0.000
3	44	-1.916	0.082	-5.761	0.000	-3.778	0.001	-0.705	0.717	1.581	0.314	-8.774	0.000	-4.128	0.003
4	44	-3.263	0.130	-8.194	0.000	-6.603	0.011	-1.654	0.509	0.453	0.848	-10.194	0.000	-6.756	0.002
5	44	-3.067	0.006	-10.250	0.000	-8.087	0.000	-1.807	0.474	-2.905	0.091	-11.191	0.000	-7.166	0.000
6	**44**	**-3.287**	**0.000**	**-12.116**	**0.000**	**-9.646**	**0.000**	**-3.476**	**0.079**	**-4.310**	**0.004**	**-15.078**	**0.000**	**-7.867**	**0.000**
7	44	-4.325	0.000	-13.556	0.000	-10.573	0.000	-5.801	0.012	-5.564	0.004	-17.139	0.000	-9.370	0.000
8	44	-4.724	0.000	-15.404	0.000	-10.965	0.000	-5.312	0.002	-6.867	0.000	-18.761	0.000	-10.773	0.000
9	44	-4.903	0.000	-15.770	0.000	-11.392	0.000	-7.758	0.029	-5.046	0.000	-18.005	0.000	-10.376	0.000
10	44	-5.036	0.000	-16.610	0.000	-12.539	0.000	-3.750	0.065	-5.134	0.000	-18.958	0.000	-10.657	0.000
11	44	-3.516	0.000	-16.079	0.000	-11.875	0.000	-3.019	0.162	-5.022	0.001	-19.306	0.000	-10.066	0.000
12	**44**	**-1.232**	**0.483**	**-14.343**	**0.000**	**-10.403**	**0.000**	**-2.981**	**0.435**	**-1.158**	**0.556**	**-17.279**	**0.000**	**-8.538**	**0.000**
13	44	-1.863	0.005	-16.445	0.000	-12.521	0.000	-8.133	0.022	-1.037	0.311	-23.714	0.000	-10.779	0.000
14	44	-2.222	0.000	-17.375	0.000	-13.118	0.000	-7.689	0.000	-3.094	0.002	-25.623	0.000	-11.771	0.000
15	44	-2.131	0.028	-18.079	0.000	-13.519	0.000	-5.886	0.001	-2.353	0.138	-24.683	0.000	-12.760	0.000
16	44	-2.780	0.000	-20.472	0.000	-15.093	0.000	-7.509	0.000	-4.631	0.001	-28.745	0.000	-14.645	0.000
17	44	-0.997	0.092	-20.674	0.000	-15.339	0.000	-4.262	0.017	-5.170	0.001	-28.312	0.000	-14.140	0.000
18	44	-1.537	0.043	-21.487	0.000	-16.557	0.000	-4.377	0.079	-4.870	0.001	-30.237	0.000	-14.148	0.000
19	44	-0.764	0.194	-21.555	0.000	-16.406	0.000	-0.186	0.924	-6.739	0.000	-31.275	0.000	-13.637	0.000
20	44	0.672	0.237	-21.855	0.000	-17.528	0.000	-1.530	0.496	-4.627	0.019	-31.931	0.000	-12.644	0.000
21	44	0.469	0.438	-21.857	0.000	-18.457	0.000	-4.773	0.035	-5.224	0.005	-30.608	0.000	-11.974	0.000
22	44	2.073	0.006	-21.333	0.000	-18.713	0.000	-0.271	0.858	-4.115	0.016	-29.657	0.000	-10.996	0.000
23	44	3.742	0.004	-20.874	0.000	-18.400	0.000	-0.302	0.897	-2.591	0.067	-30.904	0.000	-9.973	0.000
24	**44**	**4.568**	**0.000**	**-19.913**	**0.000**	**-18.008**	**0.000**	**2.470**	**0.163**	**-0.648**	**0.673**	**-30.321**	**0.000**	**-8.712**	**0.000**

Notes:
N: sample size.
CAR: cumulative average abnormal return over a corresponding month after the REIT admission. Controls or references are defined in section 6.1.1.
For the determination of the statistical significance of the *CARs* the test proposed by Espenlaub et al. (2000) of the Crude Dependence Adjustment test by Brown & Warner (1980) was used, as shown in expression (10).

Table 6. Univariate analysis of buy-and-hold abnormal return (*BHAR*) by explanatory firm, flotation and market characteristics.

		BHAR (%)											
Time		**6 MONTHS**				**12 MONTHS**				**24 MONTHS**			
Characteristics /Control	**Sample size**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**
Panel A. Total sample	44	*** -12.29 [a]	*** -9.10 [a]	*** -16.90 [a]	*** -8.13 [a]	*** -16.12 [a]	*** -10.88 [a]	*** -18.87 [a]	*** -9.84 [b]	*** -23.45 [a]	*** -19.34 [a]	*** -33.83 [a]	* -10.38 [c]
		(-12.36) [a]	(-6.76) [a]	(-12.95) [a]	(-3.87) [b]	(-16.20) [a]	(-6.00) [a]	(-14.93) [a]	(-5.39) [b]	(-17.72) [a]	(-18.71) [a]	(-22.08) [a]	(-5.99)
Panel B. Size													
Large ≥ €52m	22	** -9.63 [b]	** -9.00 [b]	* -11.89 c	* -8.24	*** -14.73 [a]	*** -10.49 [a]	** -14.65 [b]	** -11.45 c	*** -20.84 [a]	*** -16.46 [a]	** -22.90 [b]	* -16.51 [c]
		-(8.81) [b]	(-4.80) [b]	(-2.74)	(0.18)	(-12.65) [a]	(-4.03) [b]	(-6.26) c	(-4.26) c	(-17.72) [b]	(-20.05) [a]	(-14.67) [a]	(-6.58)
Small < €52m	22	*** -14.96 [a]	*** -9.20 [a]	*** -21.92 [a]	** -8.02 [b]	*** -17.50 [a]	***-11.28 [b]	*** -23.09 [a]	* -8.23	*** -26.06 [a]	*** -22.22 [a]	*** -44.77 [a]	-4.25
		(-13.08) [a]	(-7.39) [a]	(-15.61) [a]	(-6.31) b	(-24.9) [a]	(-11.67) [a]	(-18.04) [a]	(-5.60)	(-20.12) [a]	(-17.50) [a]	(-27.66) [a]	(-2.57)
Mean test of differences		*-5.33*	*-0.20*	*-10.03*	*0.22*	*-2.77*	*-0.79*	*-8.44*	*3.22*	*-5.22*	*-5.76*	*-21.87 [c]*	*12.26*
Median test of differences		*-4.27 [c]*	*-2.59*	*-12.87*	*-6.49*	*-12.25*	*-7.64*	*-11.78*	*-1.34*	*-2.40*	*2.55*	*-12.99 [c]*	*4.01*
Panel C. Age													
Old ≥ 2.3 years	22	*** -6.97 [b]	** -5.58 [b]	* -14.72 [c]	** -9.04 [b]	*** -13.60 [a]	*** -9.20 [a]	** -16.12 [b]	*** -15.50 [a]	*** -19.46 [b]	*** -15.21 [a]	*** -27.98 [b]	** -18.55 [c]
		(-10.35) [b]	(-6.62) [b]	(-9.24)	(-7.45) [b]	(-14.18) [a]	(-9.87) [b]	(-9.15) [b]	(-15.50) [b]	(-16.72) [b]	(-17.46) [a]	(-16.65) [a]	(-15.18)
Young < 2.3 years	22	*** -17.61 [a]	*** -12.62 [a]	*** -19.09 [a]	* -7.22	*** -18.63 [a]	*** -12.57 [a]	***- 21.61 [a]	-4.17	*** -27.44 [a]	*** -23.47 [a]	*** -39.69 [a]	-2.21
		(-13.08) [a]	(-6.76) [a]	(-18.29) [b]	(-1.64)	(-19.37) [b]	(-4.85) [b]	(-21.91) [b]	(-4.39)	(-23.32) [b]	(-19.80) [a]	(-27.88) [a]	(0.61)
Mean test of differences		*** *-10.64* [b]	* *-7.04* [c]	*-4.37*	*1.82*	*-5.03*	*-3.37*	*-5.49*	* *11.33* [c]	*-7.98*	*-8.26*	*-11.71*	* *16.34* [c]
Median test of differences		*-2.73 [c]*	*-0.14*	*-9.05*	*5.81*	*-5.19*	*5.02*	*-12.76*	*11.11*	*-6.60*	*-2.34*	*-11.23*	*15.79*
Panel D. Debt													
High ≥ 0.34	22	*** -11.27 [b]	** -8.61 [b]	** -17.76 [b]	** -10.30 [b]	*** -17.18 [a]	***-11.61 [a]	*** -22.06 [a]	*** -13.66 [b]	*** -23.84 [a]	*** -16.61 [a]	*** -35.99 [a]	* -14.63 [c]
		(-12.69) [a]	(-6.60) [b]	(-8.63) [b]	(-4.27)	(-19.37) [a]	(-9.41) [a]	(-20.34) [a]	(-10.20) [b]	(-20.46) [a]	(-19.55) [a]	(-27.30) [a]	(-9.31)
Low < 0.34	22	*** -13.31 [a]	*** -9.60 [b]	*** -16.05 [a]	* -5.96 [c]	*** -15.05 [a]	** -10.15 [b]	** -15.67 [b]	-6.02	*** -23.06 [a]	*** -22.07 [a]	*** -31.68 [a]	-6.13
		(-11.23) [a]	(-6.96) [a]	(-13.16) [a]	(-3.19)	(-13.2) [a]	(-4.90) [b]	(-9.15) [b]	(-3.26)	(-15.99) [a]	(-17.90) [a]	(-18.58) [a]	(3.48)
Mean test of differences		*-2.04*	*-0.99*	*1.72*	*4.34*	*2.13*	*1.46*	*6.39*	*7.64*	*0.78*	*-5.45*	*4.31*	*8.50*
Median test of differences		*1.46*	*-0.36*	*-4.53*	*1.08*	*6.17*	*4.51*	*11.19*	*6.94*	*4.47*	*1.65*	*8.72*	*12.79*

Table 6. cont.

		BHAR (%)											
Time		**6 MONTHS**				**12 MONTHS**				**24 MONTHS**			
Characteristics /Control	**Sample size**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**
Panel E. Share retained by executives													
High ≥ 45%	22	*** -16.83 [a]	*** -13.95 [a]	*** -16.08 [a]	** -10.70 [b]	*** -19.88 [a]	*** -16.50 [a]	*** -15.98 [b]	** -13.41 [b]	*** -25.45 [a]	*** -25.78 [a]	*** -29.23 [b]	-3.90
		(-13.71) [a]	(-7.87) [a]	(-13.70) [a]	(-4.98) [c]	(-17.46) [a]	(-12.07) [a]	(-11.04) [a]	(-10.40) [b]	(-19.66) [a]	(-18.96) [a]	(-23.34) [a]	(0.67)
Low < 45%	22	*** -7.76 [a]	**-4.25 [b]	** -17.73 [b]	-5.56	*** -12.35 [a]	** -5.26 [c]	*** -21.76 [a]	-6.27	*** -21.45 [a]	*** -12.90 [a]	*** -38.44 [a]	* -16.85 [c]
		(-11.65) [a]	(-4.75) [b]	(-8.39) [b]	(-3.19)	(-14.67) [a]	(-2.45)	(-27.40) [a]	(0.26)	(-17.72) [a]	(-18.39) [a]	(-18.22) [a]	(-10.02)
Mean test of differences		** *9.07* [b]	*** *9.70* [b]	*-1.65*	*5.14*	* *7.53*	*** *11.24* [b]	*-5.78*	*7.14*	*4.00*	** *12.88* [b]	*-9.21*	*-12.95*
Median test of differences		*2.06*	*3.12*	*5.31*	*1.79*	*2.79*	*9.62 c*	*-16.36*	*10.66*	*1.94*	*0.57*	*5.12*	*-10.69*
Panel F. Adjusted initial-day return													
Positive ≥ 0 (winner)	30	*** -13.42 [a]	*** -9.39 [a]	*** -17.00 [a]	** -7.80 [b]	*** -15.98 [a]	*** -11.29 [a]	*** -20.19 [a]	** -9.33 [b]	*** -24.87 [a]	*** -19.78 [a]	*** -38.06 [a]	-11.04
		(-12.36) [a]	(-6.33) [a]	(-8.95) [b]	(-5.33) c	(-14.18) [a]	(-3.75) [a]	(-20.34) [a]	(-4.47) [c]	(-17.72) [a]	(-19.20) [a]	(-22.08) [a]	(0.61) [c]
Negative <0 (loser)	14	*** -9.88 [a]	*** -7.97 [b]	*** -16.70 [b]	* -8.83	*** -16.41 [a]	* -9.31 c	*** -16.03 [b]	-10.92	*** -20.42 [a]	*** -17.62 [a]	*** -24.78 [a]	-8.95
		(-11.29) [a]	(-7.62) [a]	(-12.95) [b]	(-2.85)	(-25.65) [a]	(-13.68) [b]	(-10.47) [b]	(-5.39)	(-18.99) [a]	(-18.22) [a]	(-22.03) [a]	(-9.31)
Mean test of differences		*3.54*	*1.42*	*0.31*	*-1.03*	*-0.43*	*1.98*	*4.16*	*-1.59*	*4.45*	*2.16*	*13.28*	*2.09*
Median test of differences		*1.07*	*-2.29*	*-4.00*	*2.48*	*-11.47*	*-9.93*	*9.87*	*-0.92*	*-1.27*	*0.98*	*0.05*	*-9.92*
Panel G. Market													
Hot	33	*** -14.51 [a]	*** -8.25 [a]	*** -21.90 [a]	*** -9.47 [a]	*** -18.97 [a]	*** -9.99 [a]	*** -19.23 [a]	** -8.90 [b]	*** -23.38 [a]	*** -15.19 [a]	*** -28.88 [a]	-1.69
		(-12.99) [a]	(-7.18) [a]	(-17.78) [a]	(-6.45) [a]	(-25.22) [a]	(-10.45) [a]	(-18.97) [a]	(-6.18)	(-16.47) [b]	(-17.43) [a]	(-21.06) [b]	(3.21)
Cold	11	-5.65	* -11.65 [c]	-1.92	-4.10	-7.55	* -13.56 [c]	-17.76	-12.64	** -23.67 [c]	*** -31.78 [a]	*** -48.71 [a]	*** -36.43 [b]
		(-4.95)	(-2.72)	(-1.22)	(2.23)	(-7.72)	(-0.62)	(-3.39)	(-4.18)	(-18.47) [b]	(-21.34) [a]	(-23.10) [b]	(-22.96) [b]
Mean test of differences		*8.86*	*-3.40*	** *19.98* [b]	*5.37*	* *11.42* [c]	*-3.57*	*1.47*	*-3.74*	*-0.29*	** *-16.59* [c]	*-19.83*	** *-34.74* [b]
Median test of differences		*8.04* [b]	*4.46*	*16.56* [b]	*8.68*	*17.50* [b]	*9.83*	*15.58*	*2.00*	*-2.00*	*-3.91*	*-2.04*	*-26.17* [b]

Table 6. cont.

		BHAR (%)											
Time		**6 MONTHS**				**12 MONTHS**				**24 MONTHS**			
Characteristics /Control	**Sample size**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**
Panel H. Property type													
Diversified	13	** -13.81 c	** -13.43 c	** -16.08 b	-8.48	-11.16	** -11.55 c	** -14.33 b	-7.83	** -19.85 c	*** -25.68 a	*** -29.91 a	-3.55
		(-12.99) c	(-7.59) a	(-22.55) b	(-2.17)	(-7.72)	(-5.94) c	(-24.84) b	(-7.52)	(-5.95)	(-25.75) a	(-23.10) a	(-10.84)
Specialised	31	*** -11.66 a	*** -7.29 a	*** -17.26 a	** -7.98 b	*** -18.19 a	*** -10.60 a	*** -20.77 a	** -10.68 b	*** -24.96 a	*** -16.68 a	*** -35.48 a	** -13.24 a
		(-11.20) a	(-6.33) a	(-12.88) a	(-4.21) b	(-20.63) a	(-10.45) a	(-12.75) a	(-4.61) c	(-22.44) a	(-17.57) a	(-21.06) a	(-3.74)
Mean test of differences		*2.15*	*6.14*	*-1.18*	*0.50*	*-7.03*	*0.95*	*-6.44*	*-2.85*	*-5.11*	*9.00*	*-5.57*	*-9.69*
Median test of differences		*1.79*	*1.26*	*9.67*	*-2.04*	*-12.91*	*-4.51*	*12.09*	*2.91*	*-16.49*	*8.18*	*2.04*	*7.10*
Panel I. Management													
Internal	10	-6.29	-5.61	-1.44	-6.75	** -11.44 b	*** -10.85 b	** -13.06 c	** -15.21 c	-11.95	** -19.48 c	-22.04	-6.79
		(-5.53) c	(-0.27)	(-3.12)	(-7.45)	(-10.90) b	(-3.97) b	(-13.97) c	(-21.04) c	(-15.99)	(-14.89) c	(-15.81)	(-4.79)
External	34	*** -14.06 a	*** -10.13 a	*** -21.45 a	** -8.54 b	*** -17.49 a	*** -10.89 a	*** -20.58 a	*-8.26 c	*** -26.83 a	*** -19.30 a	*** -37.30 a	* -11.43 c
		(-12.84) a	(-7.40) a	(-20.17) a	(-2.85) c	(-21.34) a	(-8.20) a	(-14.93) a	(-4.39)	(-20.46) a	(-18.96) a	(-24.83) a	(-5.99)
Mean test of differences		* *-7.77*	*-4.52*	** *-20.01* c	*-1.79*	*-6.05*	*-0.04*	*-7.52*	*6.95*	* *-14.88*	*0.18*	*-15.26*	*-4.64*
Median test of differences		*-7.31*	*-7.13*	*-17.05*	*4.60*	*-10.44*	*-4.23*	*-0.96*	*16.65*	*-4.47*	*-4.07*	*-9.02*	*-1.20*
Panel J. Previous private placement													
Yes	11	*** -10.84 a	*** -5.79 b	*** -25.50 b	-0.19	-5.67	* -1.82	-14.05	6.54	-5.69	** -8.19 b	** -23.82 c	8.46
		(-12.04) b	(-5.22) b	(-24.93) b	(2.61)	(-3.60)	(-0.22)	(-9.34)	(11.14)	(-1.89)	(-11.59) b	(-13.95) c	(13.98) c
No	33	*** -12.78 a	*** -10.21 a	*** -14.04 a	*** -10.78 a	*** -19.60 a	*** -13.90 a	*** -20.47 a	*** -15.30 a	*** -29.37 a	*** -23.06 a	*** -37.17 a	** -16.66 b
		(-12.69) a	(-7.21) a	(-12.31) a	(-6.45) b	(-24.98) a	(-13.68) a	(-17.11) a	(-11.18) b	(-23.77) a	(-21.34) a	(-27.23) a	(-11.71) b
Mean test of differences		*-1.94*	* *-4.42*	*11.46*	** *-10.59* b	** *-13.93* b	*** *-12.08* b	*** *-6.42* a	*** *-21.84* a	** *-23.68* b	*** *-14.87* a	* *-13.35*	** *-25.12* b
Median test of differences		*-0.65*	*-1.99*	*12.62*	*-9.06 c*	*-21.38* c	*-13.46* b	*-7.77*	*-22.32* a	*-21.88* b	*-9.75* b	*-13.28*	*-25.69* b

Table 6. cont.

		BHAR (%)											
Time		**6 MONTHS**				**12 MONTHS**				**24 MONTHS**			
Characteristics /Control	**Sample size**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**	**SMALL**	**EPRA NAREIT**	**SIZE PORTF.**	**ILLIQ. PORTF.**
Panel K. Reference price													
Higher than that determined by the appraiser	18	*** -19.15 [a]	** -12.24 [b]	*** -24.17 [a]	*** -15.23 [a]	*** -25.17 [a]	*** -16.38 [a]	*** -33.13 [a]	*** -19.17 [a]	*** -42.25 [a]	*** -30.01 [a]	*** -58.43 [a]	*** -24.00 [b]
		(-13.95) [a]	(-7.20) [b]	(-18.46) [a]	(-7.23) [a]	(-25.10) [a]	(-14.94) [a]	(-25.08) [a]	(-21.04) [a]	(-49.82) [a]	(-25.88) [a]	(-44.29) [a]	(-14.75) [b]
Equal to or below that determined by the appraiser	21	*** -8.44 [a]	*** -7.53 [a]	** -12.12 [b]	-3.83	*** -12.20 [a]	*** -8.84 [a]	** -10.92 [b]	-7.19	* -11.02	*** -13.12 [b]	** -16.47 [b]	-4.87
		(-9.59) [a]	(-7.62) [a]	(-12.88) [b]	(-0.26)	(-14.06) b	(-5.94) [a]	(-8.19) [c]	(2.86)	(-14.31)	(-17.43) [b]	(-17.92) [b]	(-8.24)
Mean test of differences		*** *10.71* [b]	*4.71*	* *12.05* [c]	** *11.40* [b]	** *12.97* [b]	* *7.54* [c]	*** *22.21* [a]	** *11.98* [c]	*** *31.23* [a]	*** *16.89* [b]	*** *41.96* [a]	** *19.13* [c]
Median test of differences		*4.36*	*-0.42*	*5.58*	*6.97* [b]	*11.04* [c]	*9.00*	*16.89* [b]	*23.90* [c]	*35.51* [a]	*8.45* [b]	*26.37* [a]	*6.51*

Notes:
Figures in % except sample size.
BHAR: equally weighted average cross-sectional buy-and-hold abnormal return. Controls or references (SMALL, EPRA NAREIT and size and illiquidity portfolio) are defined in section 6.1.1.
Median values are reported between parentheses.
Differences between mean values are tested by the *t* test. Differences in medians are tested by the Kruskal-Wallis test.
[a], [b], [c] significant at the 1%, 5% and 10% levels, respectively.
***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

Table 7. Multivariate analysis of buy-and-hold abnormal return (BHAR) for a post-REIT admission window of 24 months by explanatory firm, flotation and market characteristics.

	M1			M2			M3			M4			M5		
	SMALL	**EPRA**	**SIZE PORT.**	**SMALL**	**EPRA**	**SIZE PORT.**	**SMALL**	**EPRA**	**SIZE PORT.**	**SMALL**	**EPRA**	**SIZE PORT.**	**SMALL**	**EPRA**	**SIZE PORT.**
Intercept	**- 0.391 [b]	**-0.371 [a]	***-0.858 [a]	**-0.263 [b]	**-0.198 [b]	**-0.355 [b]	**-0.320 [b]	***-0.407 [a]	**-0.523 [c]	-0.333	***-0.547 [a]	***-0.923 [a]	-0.294	***-0.455 [a]	***-0.965 [a]
LNSIZE	0.013	0.049	***0.129 [a]							0.004 [c]	0.044 [c]	**0.127 [a]	0.029	**0.057 [a]	***0.135 [a]
LNAGE				0.051	0.049	0.084	*0.075 [c]	0.046	0.093	0.074 [c]	0.028	0.043			
LNDEBT	**0.450 [b]	0.271	0.211				*0.464 [c]	*0.359 [c]	0.266	*0.459	0.296	0.089			
EXECUTIVES	-0.001	**-0.001 [b]	0.002										0.001	**0.002 [b]	0.001
AR SMALL/EPRA				1.254 [c]	-0.117	1.096 [b]									
MARKET							-0.117	0.114	0.179	-0.116	0.126	0.216	-0.015	**0.215 [b]	0.233
PROPERTY				-0.026	-0.127	-0.038									
MANAGEMENT	**0.254 [b]	0.068	0.086										*0.220 [c]	0.094	0.112
PPP	**0.314 [b]	** 0.176 [b]	0.111	**0.254 [b]	*0.136 [c]	0.084	**0.285 [b]	0.106	0.007	**0.286 [b]	0.117 [c]	0.037	**0.303 [b]	**0.119 [b]	0.052
REFERENCE PRICE	***-0.329 [a]	**-0.196 [b]	***-0.468 [a]	***-0.266 [b]	*-0.130 [b]	**-0.361 [b]	**-0.301 [b]	**-0.173 [b]	**-0.390 [b]	*** -0.308 [a]	**-0.187 [a]	*** -0.429 [b]	***-0.282 [a]	*-0.016 [b]	***-0.437 [a]
N	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
R^2	43.85%	37.73%	35.70%	35.00%	25.14%	28.49%	40.55%	33.71%	28.18%	40.57%	38.18%	37.37%	36.88%	45.89%	38.82%
Adjusted R2	33.32%	26.05%	23.63%	25.14%	13.80%	17.66%	31.54%	23.67%	17.29%	29.43%	26.60%	25.63%	25.05%	35.74%	27.35%
F-test statistic	4.87 [a]	2.91 [b]	3.77 [a]	5.97 [a]	2.67 [b]	4.29 [a]	5.82 [a]	2.60 [c]	3.33 [b]	4.90 [a]	2.80 [b]	4.68 [a]	3.80 [a]	4.53 [a]	5.12 [a]
VIF	1.09-1.20	1.09-1.20	1.09-1.20	1.03-1.11	1.03-1.11	1.03-1.11	1.11-1.16	1.11-1.16	1.11-1.16	1.11 - 1.27	1.11 - 1.27	1.11 - 1.27	1.04-1.22	1.04-1.22	1.04-1.22

Notes:

Multiple linear regression models estimated by cross-sectional Ordinary Least Squares (OLS). Dependent variable is the buy-and-hold abnormal return for a post-REIT admission window of 24 months. Controls or references (SMALL, EPRA and size portfolio) are defined in section 6.1.1. Heteroscedasticity has been corrected using White's methodology.

The variables are described in Appendix 1.

N: sample size

VIF: Variance Inflation Factor. Minimum-maximum values are reported.

[a], [b], [c] significant at the 1%, 5% and 10% levels, respectively.

***, **, * significant at the 1%, 5% and 10% levels, respectively, using the bootstrap methodology.

The data reveal that the smallest (Panel B), youngest (Panel C) and the companies with the highest shares retained by executives (Panel E), positive adjusted initial-day return (Panel F), external management (Panel I) and that went public in a hot market (Panel G) underperform more severely than their counterparts. However, the differences with their counterparts in mean and median are not statistically significant for most controls, so the results obtained are not conclusive.

Nevertheless, the two variables that capture the characteristics of the flotation on this market, namely Previous Private Placement (PPP) and reference price (Panels J and K, respectively), are the only ones that have statistically significant differences in mean and median values between subgroups for most controls. Thus, for all periods, we observe in Panel K of Table 6 that the REITs in which the members of the board of directors set a reference price for the start of trading above the price determined by the appraiser experience a worse aftermarket performance than REITs in which this reference price is equal to or less than the price determined by the appraiser, confirming hypothesis H10. Furthermore, panel J of Table 6 exhibits the results found with respect to the aftermarket performance obtained by dividing the sample into the REITs that have carried out previous private placement and those that have not. In line with hypothesis H9, the performance of the subsample with PPP is better than that of the sample without previous placement in all the periods except for 6 months, where the difference is only statistically significant for an illiquidity portfolio control. While the effect of this variable on the aftermarket performance of listing REITs has not been explored by earlier studies, the evidence is in line with results documented by Cai et al. (2011) for non-REIT companies.

Table 7 shows the multivariate analysis, in which several regression models (see equation (11)) are estimated, $BHAR_{i24}$ being the dependent variable.[19] Neither the correlation matrix in Table A2 nor the Variance Inflation Factors (VIF_i) suggest that multicollinearity is a concern. The F-statistic suggests a significant linear relationship between the dependent variables and the explanatory variables taken together, except when the illiquidity portfolio is employed as a control.[20]

[19] Evidence remains unaltered when the dependent variable in the regression models is CAR_{i24}. For the sake of brevity, results are not shown but they can be obtained from the authors on request.
[20] For the sake of brevity, results are not shown when the control used is the illiquidity portfolio, but they can be obtained from the authors on request.

The results are similar to those obtained in the univariate analyses. Thus, the REFERENCE PRICE variable is significant in all the regression models whose level of adjustment is significant (SMALL, EPRA and size portfolio). The negative sign of the coefficient indicates that the aftermarket performance is worse when the reference price is higher than the price determined by the appraiser (*H10*). In relation to the PPP variable, the result is not as clear as in Table 6. It is only significant when the control used is a market index (SMALL, EPRA in models 1, 2, 4 and 5 and SMALL in model 3). Its positive sign indicates that REITs that carry out a previous private placement of shares will show better aftermarket performance than REITs that do not. As for the other variables, we find weak evidence of the relationship between aftermarket performance and the variables because they are not significant in almost any case.

In brief, our results suggest that firm and market characteristics are not relevant, so we are unable to conclude that size (*H1*), age (*H2*), level of leverage (*H3*), percentage of shares retained by shareholders in executive positions (*H4*), adjusted initial day return, stock market sentiment (*H6*), property strategy (*H7*) and the type of management (*H8*) explain the underperformance. They also imply that flotation characteristics, that is, the chosen market entry mechanism and the determination of the reference price are the ones that explain the aftermarket underperformance of Spanish REITs. Consequently, they support the hypothesis that REITs that carry out a previous private placement of shares will show better aftermarket performance than REITs that do not (*H9*) and that the aftermarket performance is worse when the reference price is higher than the price determined by the appraiser (*H10*).

8. CONCLUSIONS

This study analyses the aftermarket performance of Spanish REITs during a period of 6, 12 and 24 months after their listing from November 2013 to January 2020. We measure aftermarket abnormal returns by computing buy-and-hold and cumulative abnormal returns, using a wide range of references. Our final sample is made up of 44 REITs that trade on the Spanish Multilateral Trading Facility known as MAB, which has a far more flexible regulation than the Mercado Continuo in terms of admission and trading requirements, without foregoing an adequate level of transparency. One of the

differentiating characteristics of REITs going public in this market with regard to those previously studied in other markets is that the flotations were not carried out through an Initial Public Offering but through direct listing. However, some REITs have opted for a private placement of shares prior to market entry. A key characteristic of the Spanish REITs market analysed is its reduced liquidity, which prevents institutional investors from entering. As a result, mispricing may persist over time.

In general, we find that REITs experience a significant underperformance that extends up to 24 months after their listing regardless of the methodology we employ to estimate abnormal returns. It is worth noting that the underperformance increases in the first months after the listing to slightly improve around the 11th and 12th months (possibly due to the dissemination carried out in order to comply with the minimum free float requirement previously mentioned in section 7.1) and then increases again and extends until month 24 after the listing. Therefore, we show that investors experience economically and statistically significant negative abnormal returns during the two years after the listing. This post-listing stock price underperformance, together with the evidence of positive and significant initial adjusted returns from Castaño et al. (2020), suggests that Spanish REITs were overpriced when issued.

Finally, our results suggest that the theories commonly used to explain aftermarket underperformance are not relevant in explaining the aftermarket behaviour of Spanish REITs. Instead, our evidence hints at the differentiating characteristics of going public in this market as the key features that explain it. Specifically, (i) all REITs in this market have been incorporated by direct listing; (ii) some REITs carried out a previous private placement and others have not; and (iii) the members of the board of directors of the REIT determine the reference price for the start of trading based on the price established by the appraiser.

These findings provide valuable information for national and international investors and analysts for their analysis of investment opportunities across a relevant and growing industry like that of Spanish real estate and across a booming vehicle such as REITs. The recent creation of the REIT market in Spain is a limitation because of the small sample of REITs available, but it is also an opportunity to analyse a newer and growing market.

Future research may include the implications of this phenomenon in relation to the rational valuation of stocks, market efficiency, investor's behaviour and resources allocation.

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APPENDICES

Table A1. Definition of the explanatory variables

SIZE	Market capitalisation on the listing day (number of shares by reference price), in millions of euros.
AGE	Age of the issuing company from the constitution date to the listing day.
DEBT	Total debt to total assets ratio (both from the latest annual audited accounts or interim financial information subject to a limited review by its auditor, published in the IDAM).
SHARE RETAINED BY EXECUTIVES (EXECUTIVES)	Percentage of shares directly and indirectly retained by shareholders in executive positions according to IDAM information.
ADJUSTED INITIAL RETURN (AR)	Return on the first day of trading adjusted by the IBEX Small Cap or FTSE EPRA/NAREIT Spain (SMALL/EPRA) market index, as a percentage.
MARKET	Dummy variable equal to one if there have been ten or more flotations in the year the REIT was listed (hot market), and zero (cold market) otherwise.
PROPERTY TYPE (PROPERTY)	Dummy variable equal to one if the property strategy followed by the REIT is diversified and zero if the property strategy followed by the REIT is specialised. Following Brounen & Eichholtz (2002), REITs with more than 80% of their total assets in one property type are regarded as specialised.
MANAGEMENT	Dummy variable equal to one if the management of the company is internal and zero if the management is external.
PREVIOUS PRIVATE PLACEMENT (PPP)	Dummy variable equal to one if the REIT has performed a private placement of shares (up to six months) before going public and zero otherwise.
REFERENCE PRICE	Dummy variable equal to one if the reference price determined by the board of directors of the REIT is higher than the price determined by the appraiser and zero otherwise.

Table A2. Correlation matrix computed with the Spearman Rho for the explanatory variables used in the regression models.

	LNSIZE	LNAGE	LNDEBT	EXECUTIVES	MARKET	PROPERTY	MANAG.	PPP	PREFERENCE PRICE	AR SMALL	AR EPRA
LNSIZE	1										
LNAGE	0.2061	1									
LNDEBT	0.2237	0.1202	1								
EXECUTIVES	-0.0300	0.2251	-0.0122	1							
MARKET	-0.0930	0.0434	0.0931	0.2008	1						
PROPERTY	-0.0961	-0.0373	-0.1669	0.0377	-0.0863	1					
MANAG.	0.0683	0.4057 [a]	-0.0684	0.2313	-0.1879	0.1243	1				
PPP	-0.0599	-0.2914 [c]	-0.2918 [c]	-0.1381	0.2121	0.0863	-0.3131 [b]	1			
PREFERENCE PRICE	0.1188	-0.2788 [c]	0.2423	0.0277	-0.0453	-0.0088	-0.0725	-0.1097	1		
AR SMALL	0.2942 [c]	0.0576	-0.1314	-0.0033	-0.3327 [b]	0.1706	0.3758 [b]	-0.0103	0.2879 [c]	1	
AR EPRA	0.1870	-0.0182	-0.1717	-0.1114	-0.2707 [c]	0.1706	0.2904 [c]	0.0227	0.2148	0.8930 [a]	1

Notes:
The sample size is of 44, except in PREFERENCE PRICE which is 39.
The variables are described in Appendix 1.
[a, b, c] significant at the 1%, 5% and 10% levels, respectively.

Essay III

A First Look at The Impact of the COVID-19 Pandemic on Spanish REITs

1. INTRODUCTION

Since the outbreak of COVID-19 in China at the end of 2019 and as a result of its rapid expansion, we are experiencing a shocking situation worldwide. Capital markets reacted with a severe correction, as shown in Figure 1, with high volatility mainly due to the unforeseeable magnitude and the short- and medium-term prospects of this crisis. The vertiginous expansion of COVID-19 in Europe led to the implementation of strict containment measures to try to control the pandemic, which entailed a significant loss of activity in most sectors. In Spain, on 14 March 2020, the government declared a State of Alarm under Royal Decree 463/2020, which remained in force until 21 June 2020. Pursuant to the declaration of the State of Alarm, certain commercial and hospitality activities were considered essential and allowed to open, but the rest, rated by their very nature as non-essential, were subject to a forced administrative closure. In this scenario, in the second quarter of 2020 the Spanish GDP underwent its largest 'quarter-on-quarter' contraction, with a fall of -17.8% and the unemployment rate increased by 1.3%, to stand at 15.33%.

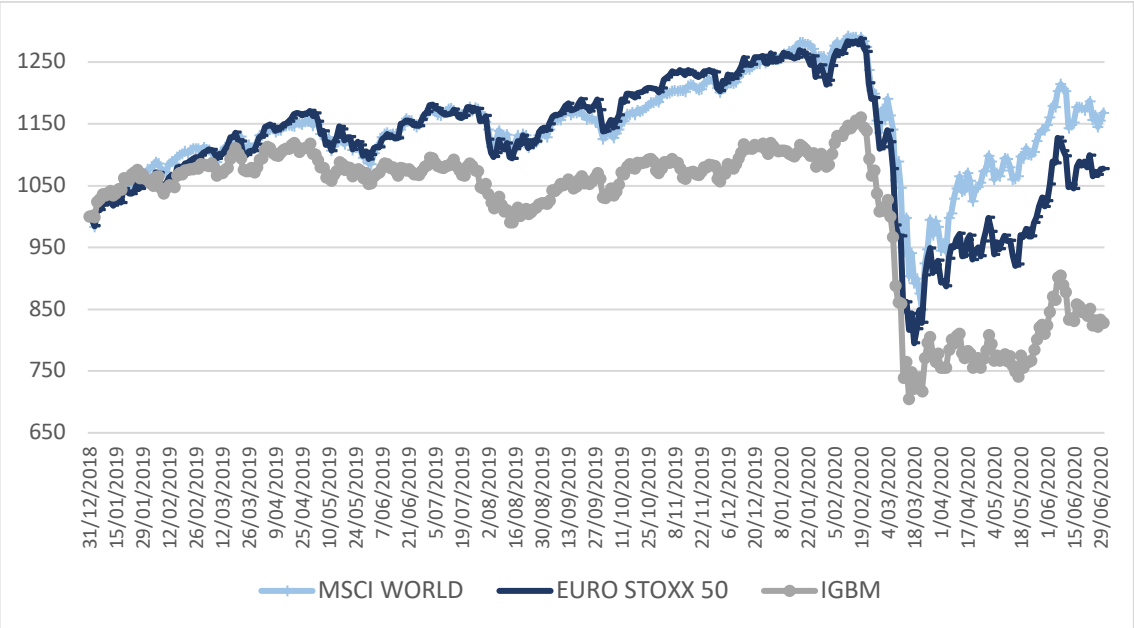


Figure 1. Evolution of the MSCI World index, Euro Stoxx 50 index and Spanish general index (IGBM) during the period 31 December 2018 to 30 June 2020.
Source:
Own elaboration based on Thomson Reuters Datastream database.

The aim of this study is to analyse the impact of the first wave of the COVID-19 pandemic on Real Estate Investment Trusts (REITs) listed in the Spanish Alternative Stock Market (*Mercado Alternativo Bursátil* – MAB).[1,2] There are several reasons that have encouraged us to study the impact on these investment vehicles. The first is the relevance of real estate activity in the Spanish economy, as it accounted for around 10% of the GDP in the period 2014-2019, as well as its attractiveness for the international investment community. Specifically, in 2019, direct investment in this sector in Spain reached €12.14 billion (excluding corporate transactions), the sixth consecutive annual record. Nearly 60% of the total amount was made up of foreign direct investment. REITs invested 9% of the total, while the rest consisted of domestic investment (CBRE, 2020). In 2020, investment in the Spanish real estate industry reached around €9.5 billion (73% of which is attributed to international investors). This figure is 24% less than in 2019. To put this decrease in context, it is worth bearing in mind that the decline in continental Europe was 20% year-on-year (CBRE, 2021). The second reason is the relevant weight of the Spanish listed REITs in Europe, which ranked first in number and third in capitalisation in June 2020 (EPRA, 2020). The third is that many of the measures imposed by the Spanish government to mitigate the transmission of the pandemic have directly affected activities related to the REITs' business. The paralysis of economic activity due to the declaration of the State of Alarm and the confinement measures has caused many employees to find themselves on furlough (in Spanish, *ERTE*) or unemployed,[3] which can lead to delays or even the non-payment of rent by some tenants. The widespread implementation of working from home in Spain caused a drop in the demand and use of offices. In addition, the effects of the pandemic have also affected shopping centres and retail establishments due to forced closures during the period of lockdown. Finally, the severe restrictions on mobility, limiting the free movement of people, have led to a sharp drop in tourism and in the demand for tourist and hotel accommodation.

Our investigation of the impact of the COVID-19 pandemic on Spanish REITs is carried out along two lines. On the one hand, we performed an analysis from the stock

[1] In Spanish terminology *Sociedades Anónimas Cotizadas de Inversión en el Mercado Inmobiliario* (SOCIMI).
[2] In October 2020 this market was renamed BME MTF Equity and Spanish REITs have been listed since then in the so-called BME Growth segment of BME MTF Equity. Nevertheless, we have kept the original name as it was the one in force during the period under analysis.
[3] *ERTE* stands for *Expediente de Regulación Temporal de Empleo* and is a measure taken by companies when, for justified reasons (economic, technical, organisational, production or others beyond their control), they decide to temporarily suspend or reduce the contracts of their workers.

market perspective. Thus, we first studied the stock market of REITs as a whole. As there is currently no market index for REITs, we created an *ad-hoc* index with the 15 most liquid REITs during the period of analysis. A first analysis involved a comparison of the evolution of the index with the rest of the Spanish indexes and with the REIT indexes worldwide. Subsequently, using the event study methodology, we computed the abnormal return of the index on the key dates of COVID-19 as well as over four longer periods related to the first official case of COVID-19 in China, the declaration of the pandemic by the World Health Organisation (WHO) and the subsequent declaration of the State of Alarm in Spain and the beginning of the de-escalation process. Second, we analysed the relationship between some characteristics of REIT firms and their stock market behaviour. We focused especially on two characteristics: the incidence of COVID-19 according to the geographical location of the assets and the property type. On the other hand, we carried out a complementary analysis from the operating performance perspective. We first computed empirical proxies for each firm during 3 semesters: two pre-COVID periods including the first and second semesters of 2019 (2019H1 and 2019H2, respectively), and a COVID period including the first half of 2020 (2020H1). We then tested whether the semester change in operating performance induced by the COVID pandemic was significantly different from the semester change in operating performance in a non-COVID period. Finally, we analysed this change according to our study characteristics, the property type and the incidence of COVID-19 depending on the location of the assets.

Our results show that in the analysis of the reaction of the market, the response to the pandemic was much smaller and occurred later than the rest of the Spanish and world REIT markets. Likewise, the abnormal return of the market was significantly negative at the time the pandemic was declared and remained negative until the beginning of the de-escalation, when it turned significantly positive until the end of the semester. In the firm-level analysis, we observed that market prices, as a consequence of the reduced liquidity of many REITs, did not reflect the impact of COVID-19. In a multivariate analysis we found that market liquidity and the percentage of shares held by institutional investors were the only variables related to abnormal returns, our two variables of interest being not significant, with a few exceptions. Finally, we found a strong negative impact on REITs' operating performance during the first half of 2020, regardless of property type and the incidence of COVID-19 by region, according to asset location.

The paper contributes to the literature as follows. This is the first piece of research, as far as we know, to analyse the impact of COVID-19 on REITs in Spain, one of the first countries to suffer the health consequences of the virus. Besides, studies on the impact of the COVID-19 pandemic on the Spanish economy have mostly focused on the index level analysis; instead, in this paper we extend the analysis to the company level. We consider it relevant to investigate the impact of such a severe public health crisis on REITs' performance and to quantify the magnitude of the actual effect. Another interesting contribution is that the results are different from those obtained in other countries and markets in the following terms: (i) a lower and later impact in the market analysis, (ii) market prices do not reflect the impact of COVID-19 in the firm-level analysis, and (iii) the property type (with the exception of diversified REITs) and the incidence of COVID-19 by region according to the location of the assets do not reflect the effect of COVID-19. Thus, the different characteristics of the market analysed, together with the different treatment of the social and health crisis in Spain compared to other EU and non-EU countries, with more restrictive measures that were common to all regions, have led to different results from those obtained so far. From our point of view, these questions are of interest both to investors, especially those who are considering possible investment options in the Spanish real estate market in the post-COVID-19 pandemic, and regulators.

The remainder of the paper is organised as follows. Section 2 describes the REIT market in Spain and the characteristics of the market analysed. Section 3 examines the empirical evidence of the impact of COVID-19 on REITs. Sections 4 and 5 describe the sample and the methodology used, respectively. The results obtained are shown in Section 6 and Section 7 concludes.

2. THE REIT MARKET IN SPAIN

The regulation of the real estate investment industry in different countries in recent decades has promoted the growth of these entities, resulting in increases in both their number and their size around the world, including Europe. In Spain, with the passing of Law 16/2012 (Reino de España, 2012),[4] the first REIT was listed at the end of 2013. The

[4] Law 16/2012 modified Law 11/2009 (Reino de España, 2009) and introduced flexibility, less restrictive conditions and tax advantages for this type of companies (García-Vaquero & Roibás, 2020). Law 16/2012

REIT market in Spain has a significant weight in the EU (including United Kingdom), since, as of 30 June 2020, it has ranked third in capitalisation and first in the number of REITs (EPRA, 2020). It should be noted, however, that most of the companies are admitted in a specific segment dedicated to REITs in the Spanish Alternative Stock Market (MAB – its initials in Spanish). In this respect, on 30 June 2020 only 4 of the 81 REITs listed on the Spanish stock market were listed in the regulated market, more widely known as the *Mercado Continuo* or SIBE. The MAB is a Multilateral Trading Facility (MTF) that has a far more flexible regulation than the *Mercado Continuo* in terms of admission and trading requirements, without foregoing an adequate level of transparency. Trading is mainly carried out multilaterally and electronically in the SIBE-SMART (the same electronic system as the one used in the *Mercado Continuo*) through a trading system called fixing, in which shares are auctioned throughout the session (from 8.30 am to 4.00 pm) with two price fixing and stock allotment times: at 12 noon and 4 pm (Bolsas y Mercados Españoles, 2017).[5]

One of the characteristics of the market under study that must be taken into account in our analysis is that it is still a developing market. For this reason, despite the existence of the figure of the Liquidity Provider,6 the MAB still has reduced liquidity compared to other more mature markets. This fact prevents a rapid and complete incorporation of public information to the market (price discovery).

In this regard, in the period under study (January 2020 to June 2020) we have calculated three liquidity proxies, the Zerovol, Zeros2 and Amihud ratio (Hilal Anwar & Hogholm, 2020) for the sample of REITs, the Spanish alternative market for small-growth firms (MAB-EE) and Spanish regulated market *Mercado Continuo* companies (MC). However, the companies whose trading system is fixing (see variable definitions in notes to Table 1) were excluded from this latter market. Since the size of the MC sample was

promoted the incorporation of these investment vehicles in Spain, making the Spanish real estate market more dynamic and providing real estate investments with liquidity.

[5] Circular 7/2017, of 20 December, on trading rules for shares in growth companies and Real Estate Investment Trusts (REITs) on the Alternative Stock Market (MAB) (Bolsas y Mercados Españoles, 2017) was repealed by Circular 5/2020, of 30 July, on contracting rules for shares in companies admitted to the BME Growth segment of BME MTF Equity (Bolsas y Mercados Españoles, 2020).

[6] The main task of the Liquidity Provider is to favour the liquidity of transactions and achieve a sufficient liquidity frequency (Bolsas y Mercados Españoles, 2017). Its presence is mandatory for all REITs.

much larger than that for REITs and MAB-EE, we have also split the MC sample into quartiles by liquidity as shown in Table 1.

Table 1. Liquidity of the REIT sample, MAB-EE and *Mercado Continuo* during the period January 2020 to June 2020.

	REIT	**MAB-EE**	***MERCADO CONTINUO***				
	Full sample	Full sample	Full sample	*Highest liquidity*	*Second quartile*	*Third quartile*	*Lowest liquidity*
ZEROVOL	0.8988	0.3259	0.0037	*0.0000*	*0.0000*	*0.0000*	*0.0151*
ZEROS2	0.4265	0.2818	0.0558	*0.0024*	*0.0146*	*0.0381*	*0.1721*
AMIHUD	1.7958	4.5836	0.2228	*0.0009*	*0.0092*	*0.0670*	*0.8347*
SAMPLE SIZE (N)	45	29	119	*30*	*30*	*30*	*29*

Notes:
ZEROVOL: mean of the number of days with zero volume/total number of trading days in the period for each firm (Kang & Zhang, 2014).
ZEROS2: mean of the number of non-zero volume days with zero returns in the period/number of non-zero volume trading days in the period for each firm (Chung & Zhang, 2014).
AMIHUD: mean of the ratio of the absolute value of daily stock return in the period and the daily trading volume in euros in the period for each firm, multiplied by one million (Amihud, 2002).
REIT, MAB-EE, *MERCADO CONTINUO:* The markets analysed are: (i) the Spanish alternative stock market for REIT (see section 2), (ii) the Spanish alternative market for small-growth firms (MAB-EE) and (iii) the Spanish regulated market *Mercado Continuo* (excluding companies whose trading system is fixing). Companies suspended, admitted or excluded during the period of analysis were not included in the samples. All the samples have been truncated at 1%.

According to Table 1, Zerovol and Zeros2 are higher in the case of REITs than in the MAB-EE and in the MC, clearly reflecting lower liquidity in the REIT sample. Moreover, the Amihud ratio is higher for REITs than for the MC, but not for the MAB-EE. This result is due to the fact that the number of days on which the price change is zero in the REIT segment is much higher than in the case of MAB-EE and, therefore, the Amihud illiquidity ratio is higher in the case of MAB-EE. Therefore, we conclude that the liquidity of the MAB segment for REITs is lower than the MAB-EE and *Mercado Continuo.*

3. EMPIRICAL EVIDENCE OF THE IMPACT OF COVID-19 ON REITS

The outbreak of the new coronavirus (COVID-19) has affected the global economy. The quarantine policy imposed in most countries has led to a weakening of purchasing power and a stagnation of the world economy, although affecting certain

sectors of the economy more severely than others. This has led to a rapid growth in the number of studies analysing its impact in different areas and regions since the pandemic began. In the financial markets, some studies focus on how stock returns have responded to changes in information and investor expectations. Most of these studies provide evidence for whole markets through the use of market index (Alfaro et al., 2020; Baker et al., 2020; Gormsen & Koijen, 2020; Lee et al., 2020; Phan & Narayan, 2020; Thorbecke, 2020) or firm level data (Ding et al., 2021; Gerding et al., 2020; Hassan et al., 2020; Ramelli & Wagner, 2020). These latter authors used the event study methodology in their analysis of the impact of the COVID-19 outbreak, although they are not the only ones (P. He et al., 2020; Liu et al., 2020; Rebucci et al., 2021; Singh et al., 2020; Wei & Han, 2021). Although many studies on COVID-19 focus on the effect of the pandemic on financial markets, there are also a few that investigate the impact of this health crisis on firm performance (Hu & Zhang, 2021; Shen et al., 2020).

However, the impact of COVID-19 in the case of REITs has been investigated separately from the rest of the industries. Their nature, specific characteristics and the regulatory restrictions to which they are subject (obligation to distribute most of their profits to their shareholders annually, limitations for their shareholders, specific organisational structures, among others (Jones Lang LaSalle & Bolsas y Mercados Españoles, 2020) mean that they must be considered a separate case study. In this regard, Ling et al. (2020) were the first to analyse the effect of COVID-19 on commercial real estate prices. They analysed the US market and created a firm-level measure of COVID-19 exposure based on the location of the properties and reported coronavirus cases at the county level. Their results showed that regional COVID-19 exposure based on a firm's properties led to a significant decrease in its performance on average, although the effect varied from one property type to another. Akinsomi (2020) examined, in a preliminary study, the impact of COVID-19 on the performance of the global REITs index and US sector index for REITs during the period from January 2020 to May 2020. The results showed that REITs have been negatively affected by the COVID-19 pandemic, especially by the effects of social distancing and closure restrictions, as they are having difficulties to meet dividend distribution obligations, to generate income through continued rent payments by tenants and to meet debt obligations. On the other hand, Milcheva (2020) analysed the impact of COVID-19 on real estate stock returns (including a sample of real estate companies that have REIT status) through the construction of a COVID-19 risk

factor. This factor is related to daily changes in confirmed global coronavirus infections to capture the risk exposure in the impact of COVID-19 on the risk-return ratio of real estate assets. The results showed that firms' beta associated to this risk factor increased markedly during the pandemic, although there are large variations across countries and sectors. Finally, Milcheva (2020) also found that COVID-19 risk is predominantly propagated by financial constraints. Xie and Milcheva (2020) investigated the relationship between cases of COVID-19 and the daily returns of real estate firms and REITs in Hong Kong during the early stage of the pandemic using a difference-in-differences approach. Their results revealed a negative relationship and a stronger effect for buildings located closer together and a weaker effect for residential properties. We can observe how Sumer and Ozorhon (2020) compared the returns of gold prices and the Turkish real estate investment trust index (T-REIT) covering the 2008 global financial crisis, the 2018 Turkish currency crisis and the 2020 pandemic-based economic crisis, and examined the effects of gold prices and the T-REIT index returns on each other. The results of the study showed that, except in the first case, the T-REIT index performs better than gold prices, but it is a riskier instrument, and neither of the investment instruments affect the performance of the other. Chiu et al. (2020) studied the impact of social isolation, confinement and business closure measures adopted in Mexico on a small sample of REITs. Their results suggested that they had a significant negative effect on the prices of REIT certificates and that the main drivers were property type and geographic asset allocation. The best performing property types were industrial and high-tech facilities. Finally, Balemi et al. (2021) provided a comprehensive literature review (qualitative meta-analysis) of the scientific papers related to the impact of the COVID-19 pandemic on real estate markets (including REIT papers).

With regard to the analysis of the impact of COVID-19 on the Spanish market, some studies have examined it in the financial and stock market context, either individually in Spain (Ahmar & del Val, 2020; Blanco Escolar et al., 2020; Fernández Cerezo et al., 2021; Hernández de Cos, 2020) or as part of a broader analysis (Alber, 2020; Ashraf, 2020; Aslam et al., 2020; Cao et al., 2020; Contessi & De Pace, 2021; Q. He et al., 2020; Just & Echaust, 2020; Onali, 2020; Zeren & Hizarci, 2020), but as far as we know no specific empirical study has been conducted on the impact on Spanish REITs.

4. SAMPLE

Our final sample consists of 46 REITs listed on the Spanish Alternative Stock Market (*Mercado Alternativo Bursátil* – MAB). To reach this figure, we made a number of adjustments to our initial sample, which consisted of all the REITs listed in that market on 31 December 2019 – a total of 78.[7] To avoid overlapping events, we eliminated from the REIT sample those firms that had gone public in a window of 240 days before the start of the period analysed, which amounted to another 10 REITs. Moreover, we discarded 17 companies that had either been delisted or had not traded or had only traded block trading, as the latter is not considered an official closing price in the period analysed (first half of 2020).[8] Finally, we excluded 5 REITs that had not submitted the financial information under study or did not have any real estate because they were involved in a corporate restructuring.

The stock market data came from the Bolsas y Mercados Españoles Group for the REIT sample and from Thomson Reuters Datastream database for the rest of the cases. The financial information was obtained from the Refinitv database and from the financial statements published by each company on the MAB website. Data on market admissions, firm and property characteristics and other information about the REITs were hand-collected from the Informational Document on Admission to the Market (IDAM) and the relevant facts available on the MAB website. Information on the number of cases of COVID-19 was obtained from the website of the National Epidemiology Centre of the Government of Spain.[9]

[7] To carry out the study, the four REITs of the Spanish *Mercado Continuo* (which is a regulated market) have not been included in the sample so that the results are not distorted by differences in the characteristics and regulation of this market and the MAB (see section 2). It should be noted that these four REITs comprise the FTSE EPRA NAREIT Spain index.

[8] Block trading is a system designed to allow members to apply cross opposite-side orders or carry out bilateral trading, provided that they meet the volume requirements established for gaining access to block trading conditions.

[9] https://cnecovid.isciii.es/covid19/#documentaci%C3%B3n-y-datos

5. METHODOLOGY

5.1. STOCK MARKET PERFORMANCE

5.1.1. Market analysis

To analyse the impact of COVID-19 on the REIT segment of the Spanish Alternative Stock Market (MAB), we created a value-weighted index with the 15 most liquid stocks during the analysed period, which we have called MAB REIT 15 Index. We selected 15 firms to make up our index so as to be analogous to the small-growth index of this market, which is composed of the 15 most liquid companies. Specifically, we measured liquidity through trading frequency. The number of each company's shares taken for calculation depends on its free float and the prices are adjusted for financial operations. The base value of this index is 1,000 on 31 December 2018. We have homogenised the base of the rest of the indexes starting from a value of 1,000 on 31 December 2018 to compare the evolution of this index with the main Spanish indexes (IBEX MAB 15, Índice General de la Bolsa de Madrid –IGBM – and IBEX Small Cap) and REIT indexes around the world (FTSE EPRA NAREIT Global, FTSE EPRA NAREIT United States, FTSE EPRA NAREIT Developed Europe and FTSE EPRA NAREIT Spain).

To measure the REIT market response to COVID-19, we used the event study methodology as in Binder (1998). The COVID-19 key days (event days) are described in Table 2.

We first analysed the response of the MAB REIT 15 index for each event, estimating the abnormal returns (*AR*) and cumulative abnormal returns (*CAR*) with expressions (1) and (2), respectively, starting on 1 January 2019 until 30 June 2020.

$$R_t = \alpha + \beta R_{mt} + \sum_{j=1}^{7} \sum_{k=-1}^{+1} \lambda_{jk} D_{tjk} + u_t \,, \tag{1}$$

$$R_t = \alpha + \beta R_{mt} + \sum_{j=1}^{6} \phi_j \, d_{tj} + u_t \,, \tag{2}$$

$$h_t = \gamma_0 + \gamma_1 \cdot h_{t-1} + \gamma_2 \cdot u_{t-1}^2$$

where R_t is the return of the MAB REIT 15 index on day t and R_{mt} is the daily return of the Madrid Stock Exchange General Index (IGBM), which is indicative of the general performance of the Spanish market. D_{tjk} is a dummy variable that takes a value of 1 on the event day for $k = t_0$, t_0-1 and t_0+1, respectively, and zero otherwise, on each key day j under analysis. In expression (2), d_{tj} is a dummy variable that takes a value of 1/(T+1) on the day of each event j (t_0) and the following T days, and zero otherwise. T takes a value of 4 on all events except for PANDEMIC and START OF STATE OF ALARM. In this case we estimated the CAR for both events jointly as these events were very close in time. Thus, T takes a value of 7 in this case.

Table 2. COVID-19 key dates during the period 31 December 2019 to 30 June 2020.

EVENT DATE	EVENT DESCRIPTION	LABEL
31-12-2019	The World Health Organisation (WHO) China Country Office is informed of cases of pneumonia of unknown aetiology (unknown cause) detected in Wuhan City, Hubei Province of China.	CHINA CASE (1)
30-1-2020	COVID-19 declared a Public Health Emergency of International Concern (PHEIC) by WHO.	EMERGENCY (2)
13-2-2020	First death from COVID-19 in Spain.	FIRST DEATH SPAIN (3)
11-3-2020	COVID-19 declared a pandemic by WHO.	PANDEMIC (4)
14-3-2020	Declaration of a State of Alarm throughout Spain by the Spanish Government to address the health emergency caused by COVID-19.	START OF STATE OF ALARM (5)
4-5-2020	Beginning of the de-escalation process in Spain.	DE-ESCALATION (6)
21-6-2020	End of the State of Alarm in Spain declared by the Spanish government on 14 March 2020.	END OF STATE OF ALARM (7)

We estimated the linear regression models (1) and (2) with the Generalised AutoRegressive Conditional Heteroscedasticity model, GARCH (1,1), to take into account the persistence of volatility. GARCH models are especially suitable for analysing daily data with leptokurtosis and volatility clustering (Bollerslev, 1986; Bollerslev et al.,

1992). For each expression (1) and (2), the conditional volatility of u_t is defined as h_t, γ_0 is the unconditional variance, γ_1 reflects the dependence of the current volatility on the volatility of the previous period and γ_2 reflects the dependence of the current volatility on the conditional variance of the previous period.

The parameter λ_{jk} in expression (1) is the abnormal return (*AR*) for event *j* and day *k* around the event. The parameter ϕ_j in expression (2) is the cumulative abnormal return (CAR) for event *j*.

In addition, and taking the COVID-19 key dates in Table 2 as a reference, we estimated the cumulative abnormal return over the first semester of 2020 (Period 1) and the following three sub-periods using expression (3):

- Period 2: the sub-period prior to the declaration of COVID-19 as a pandemic by WHO (31 December 2019 to 10 March 2020).
- Period 3: from the declaration of COVID-19 as a pandemic by WHO to the beginning of the de-escalation process in Spain (11 March 2020 to 3 May 2020). Note that the declaration of the State of Alarm was on 14 March 2020, which is included in this period.
- Period 4: from the beginning of the de-escalation process to the end of the semester (4 May 2020 to 30 June 2020).

$$R_t = \alpha + \beta R_{mt} + \varphi P_{tM} + u_t , \quad (3)$$

where P_{tM} is a dummy variable that takes a value of 1/T and zero otherwise, *T* being the number of days in each period *M* under study.

Expression (3) was estimated for the period from 1 January 2019 to 30 June 2020, excluding from the estimation in each sub-period the days corresponding to the remaining sub-periods. In this case, we estimated the regression model of expression (3) by Ordinary Least Squares (OLS) applying the methodology proposed by White (1980).[10]

[10] In expression (3), the estimation using the GARCH methodology is not possible because the series of returns are not continued in time.

5.1.2. Stock market reaction and firm characteristics.

Based on empirical evidence, we focused on two variables for our analysis. On the one hand, and as we have observed that several authors have already done (Ling et al., 2020; Xie & Milcheva, 2020), there is a variable incorporating the evolution of COVID-19. For this purpose, we created a specific variable that measures the incidence according to the location of the properties and the coronavirus cases reported at the regional (Spanish Autonomous Communities) level (GEOCOVID). Note that the assets that these REITs invest in are almost all located in Spain. On the other hand, based on the literature that shows that in several markets the impact of COVID on REITs has been different depending on the type of property (Akinsomi, 2020; Ling et al., 2020; Milcheva, 2020; Xie & Milcheva, 2020), we included the variable PROPERTY, which reflects the diversity of properties in the Spanish market. Both study variables are defined in Panel A of Table 3. We also included four control variables used in the literature: age, leverage, illiquidity and the percentage of shares held by institutional investors (Ling et al., 2020; Milcheva, 2020; Xie & Milcheva, 2020), defined in Panel B of Table 3.

We explored the firm characteristics related to REITs' stock market performance through several multiple regression models in accordance with expression (4) over the following periods: (i) the whole first semester of 2020 (Period 1 defined in section 5.2.1) and (ii) the period with the hardest restrictions of the lockdown in Spain (Period 3).

$$CAR_{i\tau} = \alpha + \sum_{j=1}^{m} \beta_j \; X_{ij} + \varepsilon_i \,, \tag{4}$$

where $(CAR_{i\tau})$ is the cumulative abnormal return for REIT i in the period analysed τ, calculated in accordance with expression 5, and X_{ij} represents the m independent variables that correspond to the selected explanatory variables named above and defined in Table 3.

Table 3. Definition of the explanatory variables.

Panel A: Study variables	
GEOCOVID	Incidence of Covid-19 by regions (Spanish Autonomous Communities) according to the location of the assets. To determine the region where the assets are located, the valuation of the assets at the end of 2019 is taken as a reference. If more than 75% of the assets are in a region, that region is selected, otherwise the location is "varied". To measure the incidence of COVID-19 by regions, the confirmed cases of COVID-19 accumulated on 30 June 2020 in each region are taken into account. The variable is the difference from the mean of the number of cumulative confirmed cases of COVID-19 in each region divided by the total number of cumulative confirmed cases in Spain. For REITs whose location is "varied", the variable takes a value of 0.
PROPERTY	Dummy variable for different property focus (property type specialisation) according to the National Association of Real Estate Investment Trust (NAREIT) categories. It takes a value from 1 to 6 for Diversified, Retail, Office, Residential, Industrial and Lodging/resorts, respectively. Following Brounen and De Koning (2012), REITs having more than 75% of their total assets in one property type are regarded as specialised in that asset type, and diversified otherwise.
DIVERSIFIED (RETAIL OFFICE RESIDENTIAL INDUSTRIAL LODGING)	Dummy variables equal to one if the property focus of the REIT is DIVERSIFIED, (RETAIL, OFFICE, RESIDENTIAL, INDUSTRIAL, LODGING) and zero otherwise. Following Brounen and De Koning (2012), REITs having more than 75% of their total assets in one property type are regarded as specialised in that asset type, and diversified otherwise.
Panel B: Control variables	
ILLIQUIDITY	Zerovol illiquidity measure proposed by Kang and Zhang (2014) in the period January 2020-June 2020 calculated as the mean of the number of days with zero trading volume divided by the total number of trading days in the period.
AGE	Time (in years) elapsed from the date of the IPO to 31 December 2019.
DEBT	Total debt to total assets ratio at the end of 2019.
INSTITUTIONAL	Percentage of shares held by institutional investors at the end of 2019.

In equation 5, we compute the $CAR_{i\tau}$ in expression (4) adding the abnormal return for REIT i on day t (AR_{it}) from the beginning (s) until the end ($s+\tau$) of the horizon considered (Period 1 and Period 3). The abnormal return is computed by the difference between the return of REIT i on day t and the return of the MAB REIT 15 Index on day t.

$$CAR_{i\tau} = \sum_{t=s}^{s+\tau} AR_{it}. \quad (5)$$

To minimise the influence of extreme values, the natural logarithms of the variables AGE (LNAGE) and DEBT (LN (1+DEBT)) have been used in expression (4). Table 4 offers a summary of the main characteristics of these explanatory variables. Note that the sample analysed is composed of companies whose flotation has taken place recently, with a low presence of institutional investors in their shareholding and low liquidity in trading. Likewise, a value of zero in the median of the GEOCOVID variable shows that most REITs do not have more than 75% of their assets located in a single region and therefore their possible impact on COVID-19 is lower. By property type, diversified REITs, residential and retail account for most of the sample.

Table 4. Descriptive statistics of the explanatory variables.

Panel A: Characteristics	Mean	Std. dev.	Min.	Median	Max.
GEOCOVID	0.085	0.103	0.000	0.000	0.214
ILLIQUIDITY (%)	90.000	11.500	55.600	93.700	99.200
AGE (years)	2.541	1.278	0.942	2.293	6.089
DEBT (%)	39.200	21.500	1.200	38.800	86.400
INSTITUTIONAL (%)	8.000	21.800	0.000	0.000	99.500
Panel B: Property		**N**		**%**	
1.DIVERSIFIED		15		32.61	
2.RETAIL		9		19.57	
3.OFFICE		4		8.70	
4.RESIDENTIAL		14		30.43	
5.INDUSTRIAL		2		4.35	
6.LODGING		2		4.35	

Notes:
The variables are described in Table 3.
The sample size (N) in Panel A is 46.

Model (4) was estimated including the property variable as a categorical variable which has been absorbed. In view of the results, different regressions were performed including each of the different types of property as a dummy variable (PROPERTY). Each regression was estimated by Ordinary Least Squares (OLS), applying the methodology proposed by White (1980). To analyse the absence of multicollinearity among the regressors, we used Spearman's *Rho* correlation coefficient among the different variables of each model. We also computed the Variance Inflation Factor (VIF).

5.2. OPERATING PERFORMANCE

To analyse the impact of COVID-19 on the financial position of REITs in the Spanish market during the first wave, we used different proxies of efficiency, profitability, leverage and valuation. Table 5 describes the variables selected to test the change in the operating performance of REITs, based on variables used in the literature to determine the operating performance of these investment vehicles in different fields and under different approaches (Bauer et al., 2010; Beracha et al., 2019; Carstens & Wesson, 2019; Coskun et al., 2020; Devos et al., 2007; Ding et al., 2021; Feng et al., 2011, 2020; Ghosh & Sun, 2014; Han, 2006; Koelbl, 2020; Ling et al., 2020; Noguera, 2020; Sah et al., 2015).

As the economic information from balance sheets and income statements is biannual, we first computed empirical proxies for each firm during 3 semesters: two pre-COVID periods including the first and second semesters of 2019 (2019H1 and 2019H2, respectively), and a COVID period including the first half of 2020 (2020H1).

Once we had defined the periods of study, we calculated the mean (median) of each variable for every firm over the different periods and compared the variables between periods. As a consequence of the well-known asymmetry of accounting ratios, and as usual in the literature, instead of the mean, we tested whether the median difference between periods was zero. In order to measure the statistical significance of the change in the variables, we used the Wilcoxon signed-rank test. Additionally, we tested whether the semester change in operating performance induced by the COVID pandemic was significantly different from the semester change in operating performance in a non-

COVID period. That is, we tested differences between the change 2020H1-2019H2 versus the change between 2019H2-2019H1. As before, we employed the Wilcoxon signed-rank test to test significance.

Table 5. Definition of operating performance variables.

VARIABLE	DEFINITION
Profitability	
ROE	Return on equity: net income to the mean book value of total equity.
ROA	Return on assets: net operating income to the mean book value of total assets.
NI/ASSETS	Net Income to total assets: net income to the mean book value of total assets.
EPS	Earnings per share: net income to the number of shares.
Efficiency	
PROFIT MARGIN	Net income to total revenues.
Leverage	
DEBT RATIO	Total debt to total assets.
Valuation	
TOBIN Q	Tobin's Q: market value of equity plus the book value of debt to the book value of assets.

Notes:
We use the mean value (that is the mean value at the beginning and end of the year) of assets and equity in the denominator for ROA, NI/ASSETS and ROE variables, respectively, since we are comparing a flow variable (income) with a fund variable (total assets and total equity).

As we found that the COVID pandemic impacts significantly on the change in the operating performance of Spanish REITs, finally we tested whether the property type and the location of the assets (GEOCOVID EXPOSURE) were related to the changes in operating performance. In this analysis, this variable takes the value HIGH when the GEOCOVID variable (described in Table 3) is greater than the mean and LOW when it is less than or equal to the mean. The null hypothesis to be tested is that the mean (median)

of each subgroup was equal to zero. To test the mean, we used the conventional *t*-test statistic. With regard to the median, we used the Wilcoxon signed-rank test. The differences in median for GEOCOVID EXPOSURE and property type were tested with the Wilcoxon rank sum (Mann-Whitney) test and Kruskal-Wallis test, respectively.

6. RESULTS

6.1. STOCK MARKET PERFORMANCE

6.1.1. Market analysis

Figures 2 and 3 illustrate the evolution of Spanish indexes and the main REIT indexes around the world during the period from 31 December 2018 to 30 June 2020, respectively, compared to the MAB REIT 15 index.

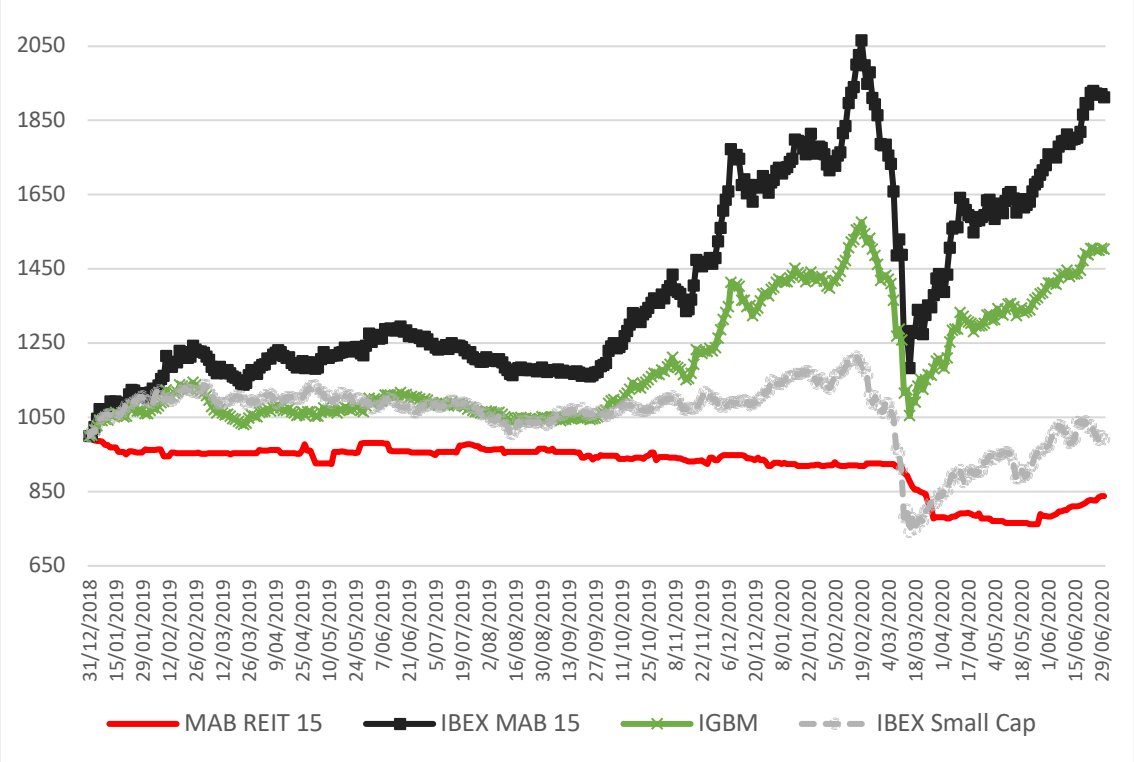


Figure 2. Evolution of several Spanish stock market indexes during the period 31 December 2018 to 30 June 2020.

Source:
Own elaboration based on Thomson Reuters Datastream database.

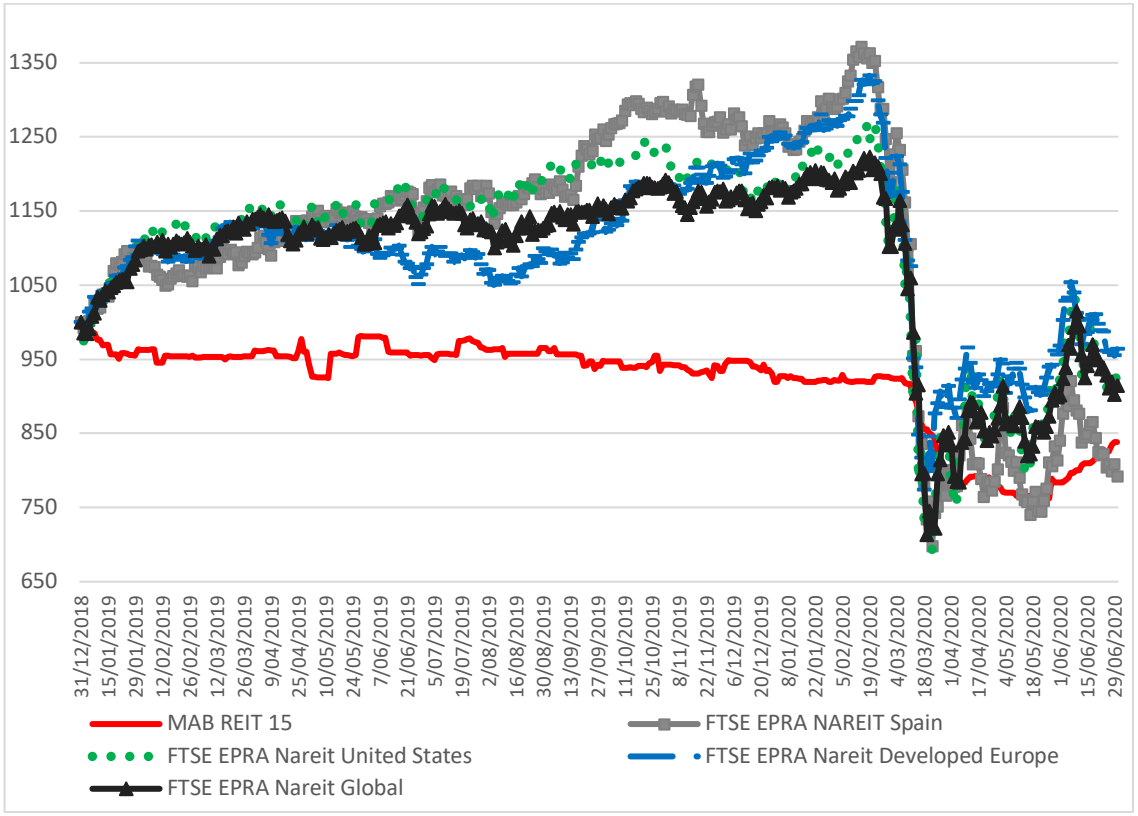


Figure 3. Evolution of the main REIT indexes around the world during the period 31 December 2018 to 30 June 2020.

Source:
Own elaboration based on Thomson Reuters Datastream database.

In both figures, the evolution of the MAB REIT 15 index throughout 2019 and up to 6 March 2020 (three trading days before the WHO declared COVID-19 a pandemic on 11 March) was very steady, with no major movements during the period. From 6 March until the end of that month, it fell by about 16%, from 924.5 points to 777.1 on 27 March. After that date, the index remained practically flat until 26 May (down only 2% since the end of March). Since then, the indicator has improved, the six-month period ending at 838 points, 9.35% lower than at the beginning when the pandemic was declared but almost 10% above the minimum value set on 25 May (762.2 points).

If we compare the evolution of the MAB REIT 15 index with the main indexes of the Spanish market (Figure 2) and REIT worldwide (Figure 3), we can see that the latter reacted earlier to the situation produced by COVID-19 (in mid-February approximately) and more intensely. Likewise, after reaching its lowest level in the period analysed, the rebound has been faster than in the case of the MAB REIT 15 index.

Table 6 shows the reaction of the Spanish REIT market proxied by the MAB REIT 15 index at COVID-19 events defined in Table 2. We did not find any significant *AR* around the COVID key dates. When we computed the CARs (panel B of Table 6), only the joint key dates PANDEMIC–START OF STATE OF ALARM event is statistically significant with a decline of -6.2%.

Table 6. Performance of the MAB REIT 15 index at COVID-19 events.

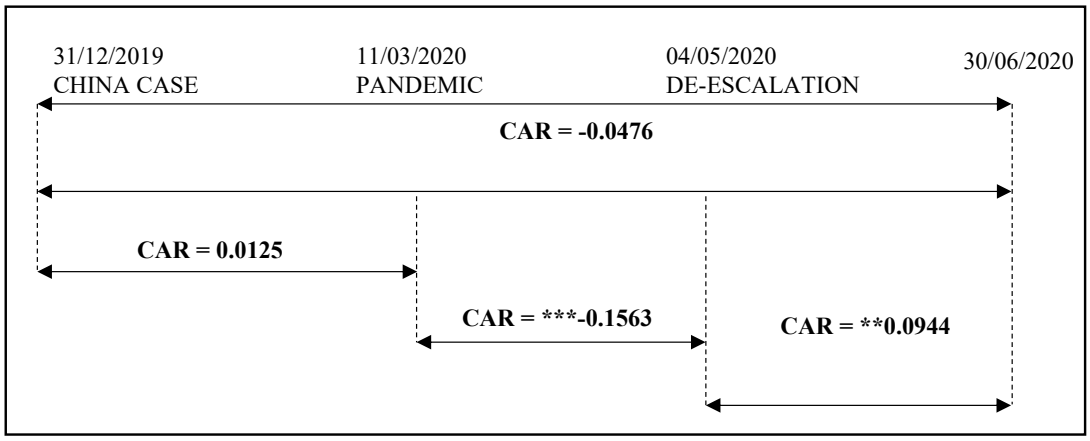
	CHINA CASE	EMERGENCY	FIRST DEATH SPAIN	PANDEMIC	START OF STATE OF ALARM	DE-ESCALATION	END OF STATE OF ALARM
Panel A: Abnormal return (AR)							
AR -1	-0.0054	-0.0030	0.0000	0.0016	-0.0105	-0.0091	0.0037
AR 0	-0.0110	0.0007	0.0002	0.0001	-0.0103	-0.0001	0.0087
AR +1	-0.0014	0.0030	-0.0001	-0.0066	-0.0209	-0.0031	0.0020
Panel B: Cumulative abnormal return (CAR)							
CAR (0, *T*)	-0.0017	0.0078	-0.0013	***-0.0620		-0.0140	0.0232

Notes:
The number of days is 381.
Multiple linear regression models estimated by Generalised AutoRegressive Conditional Heteroscedasticity (GARCH (1,1) from 1 January 2019 until 30 June 2020. Dependent variable is the return of the MAB REIT 15 Index (defined in section 5).
AR 0 (AR -1, AR+1): dummy variable taking a value of 1 on the day (the day before/the day after) of the event and zero on all other days under analysis (see expression 1).
CAR (0, *T*): dummy variable taking the value (1/(*T* +1)) on the day of each event and the following *T* days, and zero otherwise. *T* takes a value of 4 in all events except for the PANDEMIC and START OF STATE OF ALARM. In this case we estimate the CAR for both events jointly, as these events are very close in time. Thus, *T* takes a value of 7 (see expression 2).
The events are described in Table 2.
*** significant at the 1% level.

Table 7 exhibits the CAR for the four periods defined in Section 5.1.1. We found a strong negative and significant CAR for Period 3. This suggests that during the period from the declaration of COVID-19 as a pandemic by WHO to the beginning of the de-escalation process in Spain, the MAB REIT Index accumulated an abnormal performance of -15.63%. Note that this period comprises the hardest restrictions of the lockdown in Spain, which brought the economy to an almost complete standstill. However, when the last of the sub-periods is analysed (Period 4), the results show a positive and statistically significant CAR of 9.44%, thus reflecting an improvement in the expectations since the de-escalation.

Table 7. Cumulative abnormal returns (CAR) of the MAB REIT 15 index for different periods determined by COVID-19 events.

Period	CAR1	CAR2	CAR3	CAR4
Period 1 (311219 – 300620)	-0.0476			
Period 2 (311219 – 100320)		0.0125		
Period 3 (110320 – 030520)			***-0.1563	
Period 4 (040520 – 300620)				**0.0944



Notes:
Regression models estimated by Ordinary Least Squares (OLS). Heteroscedasticity has been corrected using White's methodology. Dependent variable is the return of the MAB REIT 15 Index (defined in section 5).
Period analysed: dummy variable taking the value 1/T, where *T* is the number of days of each period under study, and zero from 1 January 2019 until 30 December 2019 (see expression 3).
***, ** significant at the 1% and 5% levels, respectively

6.1.2. Stock market reaction and firm characteristics.

Next, we carried out a multivariate analysis to study the relationship between our variables of interest (GEOCOVID and PROPERTY) and the CAR of REIT firms estimated through expression (5) for the whole of the first semester of 2020 and the period with the hardest restrictions of the lockdown in Spain (Period 3). We controlled for several firm characteristics that are also related to abnormal returns. In untabulated results, we ran expression (4) including the property variable as a categorical variable that was absorbed. As the property variable was significant for the whole of the first semester of 2020 (Period 1), we re-ran expression (4) including each of the different types of property as dummy variables. Table 8 shows the results for the models with a significant *F*-statistic. No model has a Variance Inflation Factor (VIF) value that exceeds the value of 5, so there are no multicollinearity problems between the explanatory variables.

We found that the most novel explanatory variable in our study, the GEOCOVID variable, was not significant in any case, contrary to the results obtained by similar

variables in Ling et al. (2020) for the US market and Xie and Milcheva (2020), in the case of Hong Kong. The application of infection containment measures has been one of the main determinants of economic activity since the outbreak of the pandemic in Spain. From the introduction of the first restrictions in March until June, the management of containment and the first stages of de-escalation followed a centralised model under the framework of the State of Alarm. At this time there were hardly any territorial differences in the restrictions as the regional incidence of COVID-19 was not taken into account when determining the measures (Fernández Cerezo, 2021). This could explain the lack of a relationship between the CAR and the GEOCOVID variable in Table 8.

In the case of another of the variables of interest in our study, PROPERTY, the results showed that those REITs that have a diversified portfolio of assets (DIVERSIFIED) had a better stock market performance than the rest of the REITs in both periods (panels A and B of Table 8). Nevertheless, those REITs focused on the RESIDENTIAL segment showed a worse performance, which was only significant in the broader period of analysis (Panel A of Table 8). These results differ from those obtained by Akinsomi (2020), Ling et al. (2020), Milcheva (2020) and Xie and Milcheva (2020), who showed that there is substantial variation across property types, but no better performance in diversified REITs and not much worse than in the case of residential REITs.

Regarding the ILLIQUIDITY variable, the significance of this variable for both periods lead us to conclude that the market liquidity of the REITs during the period analysed influences their stock market performance. Considering that this variable measures illiquidity as the number of days with zero volume traded divided by the total number of trading days in the period (see Table 1), the positive coefficient suggests that those REITs with higher illiquidity have better stock market performance. The possible explanation for this relationship may be the fact that REITs with lower illiquidity have captured the price impact of COVID-19, while the rest have not.[11]

As far as the proportion of shares held by institutional investors (INSTITUTIONAL) is concerned, the variable is significant in the different models in both panels of Table 8. Our result differs from those obtained in the study by Ling et al.

[11] Indeed, in untabulated results, the CAR adjusted using the MAB REIT 15 index for the full sample shows a significant cumulative abnormal return of 8.8% and 14.47% in the periods 1 January 2020 to 30 June 2020 and 11 March 2020 to 3 May 2020, respectively.

(2020) and Xie and Milcheva (2020) where this variable, although with a positive and a negative coefficient, respectively, is not significant in either case. The positive sign indicates that the greater the proportion of shares held by institutional investors is, the better the performance is. We assume that the best-managed REITs attract more institutional investors and, based on the monitoring hypothesis (Tee, 2019), REITs owned by more institutional investors tend to be more carefully scrutinised by their shareholders (Hartzell et al., 2014).

Finally, with regard to the AGE and DEBT variables, unlike Ling et al. (2020) and Milcheva (2020), we observed that neither of them are consistently significant in any model or period (with the exception of the DEBT variable, which is slightly significant in some sporadic cases). The weak evidence of the relationship between these variables and the cumulative abnormal return of REITs suggests that they cannot be considered relevant characteristics.

6.2. OPERATING PERFORMANCE

The results obtained in the analysis of REITs' operating performance during the period 1 January 2019 to 30 June 2020, spanning three semesters, are shown in Table 9.

Note that for the two semesters free of COVID-19, we did not find that the operating performance changes significantly between the first half and the second half of 2019 (column A of Table 9). Only the DEBT ratio experiences a significant reduction between the two semesters. However, the COVID pandemic implied a strong statistically significant decline in the profitability and the efficiency of REITs (column B of Table 9). In addition, we found a significant increase in the debt ratio, breaking the downward trend of the previous period, whose negative change was statistically significant, in contrast to the previous cases. However, on analysing the value of the company through TOBIN's Q, the results differed from those obtained previously, as the changes in this ratio were not significant for any period, which led us to reinforce the results obtained in the previous section in the market analysis. Finally, we found that the differences between the change 2020H1-2019H2 versus the change 2019H2-2019H1 (column C of Table 9) were negative and significant in the case of profitability and efficiency ratios and significantly positive in the case of the leverage ratio. As in the previous case, the difference was not significant when we analysed TOBIN's Q.

Table 8. Multivariate analysis of cumulative abnormal return (CAR) by explanatory factors (including different property type).

	GENERAL	DIVERSIFIED	RETAIL	OFFICE	RESIDENTIAL	INDUSTRIAL	LODGING
Panel A: 1 JANUARY 2020 – 30 JUNE 2020 (Period 1)							
Intercept	-0.0417	-0.0833	-0.0410	-0.0416	-0.0569	-0.0473	-0.0427
GEOCOVID	-0.0459	-0.0401	-0.0281	-0.0481	-0.0168	-0.0418	-0.0459
ILLIQUIDITY	***0.1804	***0.2255	***0.1763	***0.1799	***0.2267	***0.1911	***0.1811
LNAGE	-0.0025	-0.0117	-0.0044	-0.0032	-0.0275	-0.0025	-0.0023
LNDEBT	*-0.1063	**-0.1330	*-0.1074	-0.1038	-0.0818	*-0.1162	*-0.1062
INSTITUTIONAL	**0.0907	**0.1190	**0.0912	**0.0901	***0.1276	**0.0914	**0.0908
DIVERSIFIED		**0.0437					
RETAIL			0.0167				
OFFICE				0.0037			
RESIDENTIAL					***-0.0644		
INDUSTRIAL						-0.0323	
LODGING							0.0018
Sample size (N)	46	46	46	46	46	46	46
R^2	19.05%	28.24%	20.08%	19.07%	34.92%	20.09%	19.06%
Adjusted R2	8.93%	17.20%	7.78%	6.62%	24.91%	7.80%	6.60%
F-test statistic	**2.53	***3.66	*2.16	*2.08	**3.45	**2.40	**2.47
VIF	1.01-1.15	1.03-1.26	1.04-1.15	1.09-1.44	1.04-1.45	1.01-1.17	1.03-1.18
Panel B: 11 MARCH 2020 – 3 MAY 2020 (Period 3)							
Intercept	-0.0577	-0.0879	-0.0578	-0.0579	-0.0628	-0.0620	-0.0409
GEOCOVID	0.0182	0.0224	0.0171	0.0229	0.0279	0.0213	0.0186
ILLIQUIDITY	***0.2468	***0.2794	***0.2470	***0.2478	***0.2623	***0.2551	***0.2341
LNAGE	-0.0074	-0.0141	-0.0073	-0.0060	-0.0158	-0.0074	-0.0114
LNDEBT	-0.0621	-0.0814	-0.0620	-0.0675	-0.0539	-0.0697	-0.0642
INSTITUTIONAL	**0.0587	**0.0792	**0.0587	**0.0599	**0.0710	**0.0592	**0.0562
DIVERSIFIED		**0.0316					
RETAIL			-0.0010				
OFFICE				-0.0079			
RESIDENTIAL					-0.0215		
INDUSTRIAL						-0.0249	
LODGING							-0.0325

Table 8. cont.

	GENERAL	DIVERSIFIED	RETAIL	OFFICE	RESIDENTIAL	INDUSTRIAL	LODGING
Sample size (N)	46	46	46	46	46	46	46
R^2	27.95%	34.42%	27.96%	28.08%	30.34%	28.79%	29.27%
Adjusted R2	18.95%	24.33%	16.87%	17.01%	19.62%	17.83%	18.38%
F-test statistic	**2.43	***2.91	**2.39	*2.19	**2.49	*2.15	**3.22
VIF	1.01-1.15	1.03-1.26	1.04-1.15	1.09-1.44	1.04-1.45	1.01-1.17	1.03-1.18

Notes:

Multiple linear regression models estimated by cross-sectional Ordinary Least Squares (OLS). Heteroscedasticity has been corrected using White's methodology. Dependent variable is the cumulative abnormal return adjusted by the MAB REIT 15 Index (CAR) during period 1: 1 January 2020 to 30 June 2020 (PANEL A) and during period 3: 11 March 2020 to 3 May 2020 (PANEL B). See expression 4.

The variables are described in Table 3.

VIF: Variance Inflation Factor. Maximum-minimum values are reported.

$^{***, **, *}$ significant at the 1%, 5% and 10% levels, respectively.

Table 9. Analysis of REITs' operating performance during the period 1 January 2019 to 30 June 2020.

VARIABLE	2019H1 Mean (median) (1)	2019H2 Mean (median) (2)	2020H1 Mean (median) (3)	(A) (2) - (1)	Z-statistic (2) - (1)	(B) (3) - (2)	Z-statistic (3) - (2)	(C) (B) - (A)	Z-statistic (B) - (A)
Profitability									
ROE	0.050 (0.018)	0.052 (0.021)	0.006 (0.009)	0.002 (0.000)	0.814	-0.046 (-0.015)	*** -3.338	-0.048 (-0.017)	** -2.507
ROA	0.017 (0.013)	0.019 (0.014)	0.011 (0.009)	0.002 (0.000)	1.032	-0.008 (-0.005)	** -2.551	-0.010 (-0.005)	** -2.092
NI/ASSETS	0.019 (0.009)	0.018 (0.010)	0.006 (0.005)	-0.001 (0.000)	1.032	-0.012 (-0.007)	** -3.119	-0.011 (-0.006)	** -2.431
EPS	0.378 (0.065)	0.424 (0.094)	0.082 (0.014)	0.046 (0.003)	1.005	-0.342 (-0.034)	*** -3.032	-0.388 (-0.068)	*** -2.868
Efficiency									
PROFIT MARGIN	0.567 (0.359)	0.487 (0.305)	0.121 (0.187)	-0.080 (0.000)	0.754	-0.366 (-0.106)	*** -2.682	-0.286 (-0.174)	** -2.180
Leverage									
DEBT RATIO	0.409 (0.428)	0.392 (0.388)	0.399 (0.389)	-0.017 (-0.011)	** -2.409	0.007 (0.006)	** 2.300	0.024 (0.017)	*** 2.737
Valuation									
TOBIN Q	1.171 (1.120)	1.184 (1.089)	1.171 (1.070)	0.013 (-0.004)	-0.639	-0.013 (-0.005)	-0.147	-0.026 (0.014)	0.978

Notes:
The sample size (N) is 46.
2020H1: the first half of 2020 (1 January 2020–30 January 2020).
2019H2: the second half of 2019 (1 July 2019–31 December 2019).
2019H1: the first half of 2019 (1 January 2019–30 June 2019).
The variables are described in Table 5.
Z-statistic: to compute the differences between the values of the medians, the Wilcoxon signed-rank test is computed.
***, ** significant at the 1% and 5%, respectively.

Table 10. Analysis of REITs' operating performance in the change between the first half of 2020 (2020H1) and the second half of 2019 (2019H2) by GEOCOVID EXPOSURE and property type.

	Panel A: GEOCOVID EXPOSURE				Panel B: PROPERTY						
VARIABLE	HIGH (N=21)	LOW (N=25)	Median Diff		DIVERSIFIED (N=15)	RETAIL (N=9)	OFFICE (N=4)	RESIDENTIAL (N=14)	INDUSTRIAL (N=2)	LODGING (N=2)	Median Diff
	Mean (median)	Mean (median)	Diff Median	Z-statistic for difference in medians	Mean (median)	Mean (median)	Mean (median)	Mean (median)	Mean (median)	Mean (median)	Chi-squared for difference in medians
Profitability											
ROE	-0.080 ***(-0.023)	-0.018 **(-0.009)	0.032	0.937	-0.078 (-0.006)	*-0.033 *(-0.017)	*-0.045 (-0.047)	*-0.030 *(-0.021)	-0.022 (-0.022)	-0.003 (-0.003)	2.108
ROA	**-0.010 **(-0.007)	-0.007 *(-0.005)	0.001	0.099	-0.007 (-0.004)	*-0.016 (-0.011)	0.001 (0.002)	-0.008 (-0.004)	*-0.005 (-0.005)	*-0.008 (-0.008)	3.009
NI/ASSETS	***-0.017 ***(-0.009)	-0.007 (-0.003)	0.005	1.114	-0.006 (-0.002)	*-0.016 *(-0.009)	-0.032 (-0.029)	*-0.011 (-0.006)	**-0.005 (-0.004)	-0.004 (-0.004)	2.841
EPS	***-0.408 **(-0.023)	-0.153 (-0.026)	-0.003	0.981	-0.459 (-0.022)	-0.025 (-0.089)	-0.110 (0.005)	*-0.291 (-0.007)	**-0.245 (-0.245)	***-0.135 (-0.135)	2.508
Efficiency											
PROFIT MARGIN	***-0.722 ***(-0.394)	-0.068 (-0.047)	0.348	1.643	0.079 (-0.047)	-0.071 (-0.053)	*-1.183 (-1.269)	*-0.878 (-0.309)	-0.091 (-0.091)	-0.105 (-0.105)	2.461
Leverage											
DEBT RATIO	***0.020 ***(0.016)	-0.004 (0.002)	-0.014	-1.643	-0.002 (0.010)	0.014 (0.008)	-0.006 (0.000)	***0.017 ***(0.012)	-0.002 (-0.002)	0.011 (0.011)	4.531
Valuation											
TOBIN Q	-0.032 (0.010)	0.003 (-0.007)	-0.017	0.276	0.004 (0.012)	-0.096 (-0.033)	0.004 (0.003)	0.017 (0.004)	-0.012 (-0.012)	-0.009 (-0.009)	2.077

Notes:

N: sample size.

The variables are described in Table 3 and Table 5. The variable analysed is the change between the first half of 2020 (2020H1) and the second half of 2019 (2019H2) (Column B of Table 9).

Median diff: differences in the medians according to GEOCOVID EXPOSURE and PROPERTY are tested with the Wilcoxon rank-sum (Mann-Whitney) test and Kruskal-Wallis test, respectively.

***, **, * significant at the 1%, 5% and 10% levels, respectively.

Therefore, results show that the COVID-19 outbreak had a significant negative impact on the performance of Spanish listed REITs, with a worsening of profitability, efficiency and leverage ratios during the first half of 2020, but not in valuation.

In Table 10 we tested whether the changes in operating performance between the first half of 2020 (2020H1) and the second half of 2019 (2019H2) (Column B of Table 9) were related to the property type and the asset allocation by the regional impact of COVID.

Thus, in the case of the GEOCOVID EXPOSURE variable, we observed that those REITs that had their assets located in an area with high COVID-19 incidence have had a worse operating performance than REITs whose assets were located in a region with low levels of COVID-19 incidence. However, since the difference in median values between subgroups is not statistically significant in any of the ratios analysed, as in the stock market performance analysis, the results obtained were not conclusive regarding the difference in the operating performance of REITs according to the GEOCOVID EXPOSURE variable.

Finally, the results found with respect to the operating performance obtained by splitting the sample according to property type showed that there was no significant difference between them.

7. CONCLUSIONS

This study analyses the impact of the COVID-19 pandemic on REITs listed on the Spanish Alternative Market (MAB) during the first wave (first semester of 2020) through two lines of analysis.

On the one hand, we carry out an analysis of stock market performance. First, from a global market perspective, we study the behaviour of an ad-hoc constructed market index for REITs. On comparing the Spanish REIT market with other markets and industries we find that this market reacts with less intensity and later than the rest of the Spanish indexes and world REIT markets. Using the event study methodology, we analyse the market reaction to several key dates related to the COVID-19 pandemic. We do not find any significant reaction of the market to the key dates under study, except

when the first wave in Spain began with the declaration of COVID-19 as a pandemic by WHO and the declaration of the State of Alarm throughout Spain by the Spanish Government. For this combined event we find a negative and significant accumulated reaction of the market of -6.2%.

The abnormal performance for periods between key dates shows a significant drop during the period with the hardest restrictions of the lockdown in Spain, which brought the economy to an almost complete standstill. In contrast, we find a significant rise since the de-escalation suggesting an improvement in the expectations of investors.

Given the previous result, we focus especially on the relationship between the property type and the incidence of COVID-19 according to the geographical location of the assets (GEOCOVID) and the individual REIT firms' stock market performance. Our results show that REITs whose investment strategy is diversified perform better in the longest period analysed (first half of 2020). However, the incidence of the pandemic according to asset allocation seems to be irrelevant. We think that this result may be explained by the fact that the measures and restrictions were homogeneous in all the Spanish regions during the first wave. It is worth highlighting (i) that there is a significant positive relationship between the stock market performance and firm illiquidity, thereby suggesting that REITs with higher liquidity capture the price impact of COVID-19 better; and (ii) that REITs with a higher percentage of shares held by institutional investors show better performance. This latter is consistent with the notion that firms with more institutional investors tend to be monitored more closely by their shareholders.

On the other hand, from the operating performance perspective, we find that the COVID-19 outbreak has a significant negative impact on the performance of Spanish listed REITs, with a significant worsening in profitability, efficiency and leverage during the first half of 2020. Regarding the relationship between this operating performance and the property type and the asset allocation characteristics, we do not find any significant differences.

Overall, and as expected, the COVID-19 pandemic has impacted negatively on the REIT industry. Our results from both the stock market and the operating performance perspectives are consistent with this notion. However, we find that the low market liquidity for most of the Spanish REITs leads to a delay in their price discovery process.

In relation to our variables of interest, namely, the incidence of COVID-19 according to the geographical location of the assets (GEOCOVID) and the property type (PROPERTY), we observe that they are not decisive in our analysis of the impact of COVID-19 on Spanish REITs except for the property variable. In this case we find that REITs that have a diversified portfolio of assets have had a better stock market performance than the rest of the REITs.

If we compare these results with those studied in other countries and markets in the empirical evidence, we see that they are different in several aspects, as we can observe in section 6 of the results. In this comparison, several issues must be taken into account. On the one hand, the Spanish REIT market has specific characteristics as it is a more recently created market with less liquidity than other more consolidated REIT markets. On the other hand, the management of the pandemic has been very different from one country to another, both inside and outside the EU. While some countries were slower to react and reacted with laxer measures, such as the United States, others, such as Spain, reacted more quickly and with far more severe containment measures, such as the confinement of the entire population in their homes from practically the moment the pandemic was declared. Similarly, while some countries opted to take different measures for specific regions depending on the prevalence of the virus, Spain opted for a centralised management of containment during the first wave. Finally, it should be kept in mind that while this crisis has had negative effects on most industries, it has been harsher in some than in others. For all these reasons, we consider our study to be relevant as it adds a little more evidence to the as-yet unknown impact of COVID-19 on financial markets. The reason underlying this claim is that it is a study on a country, Spain, which was one of the first to suffer the health consequences of the virus and on a sector, real estate, with a strong weight in the country's economy.

This is the first research, as far as we know, to analyse the impact of COVID-19 on Spanish REITs and to allow a better understanding of the behaviour of a developed country facing the impact of the pandemic. Nevertheless, we are aware that our study has several limitations. First, the small sample size analysed. Second, the sample period, as it covers only the first wave of the spread of COVID-19. In this sense, the analysis is less influenced by the political intervention of the Spanish regional governments, as during this period it was centralised and the measures imposed by the government were the same for the whole country. Therefore, future research may include the extension of the sample

period to subsequent waves of propagation so that the operating performance during the second semester of 2020 is consistent with the positive stock market expectation when de-escalation began in May 2020. Additionally, it would make it possible to analyse the impact of the different measures imposed by regional governments on the stock market and firm performance of REITs in Spain.

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Discusión y Conclusiones

El incremento de las salidas a bolsa de los REIT en Europa en los últimos años ha permitido el estudio de estos mercados cuya importancia y tamaño ha crecido notablemente. En el caso español, el número de SOCIMI (denominación en España de los REIT) ha crecido de forma exponencial desde que en el año 2013 la primera SOCIMI saliese a Bolsa. Dada la importancia que este mercado ha alcanzado dentro del sistema financiero español, a lo largo de la presente Tesis Doctoral se ha analizado diversos aspectos sobre las SOCIMI incorporadas al Mercado Alternativo Bursátil, mercado español que reúne el mayor número de estas compañías. Después de más de ocho años de funcionamiento del mercado, y con una muestra reducida pero suficiente, pensamos que es un buen momento para evaluar algunas cuestiones de las SOCIMI que anteriormente han sido analizadas en otros mercados de valores internacionales. Los conceptos planteados se han estudiado en tres trabajos empíricos que versan sobre la determinación de la infravaloración en el momento de la salida a bolsa (*Essay* I), el comportamiento de los precios tras la salida al mercado (*Essay* II) y finalmente el impacto de la pandemia del COVID-19 durante la primera ola (*Essay* III).

A pesar de que el comportamiento tras las salidas a bolsa ha sido ampliamente analizado para todo tipo de compañías (de manera más reducida en los REIT dada la más reciente popularización de los mismos en el entorno económico), consideramos relevante indagar tanto sobre el comportamiento del precio en los momentos iniciales como en su evolución posterior dada la singularidad de las operaciones producidas para la salida a bolsa en el mercado analizado (salida directa o *listing)*, el diseño del mercado y las peculiaridades del mismo y la etapa estudiada que coincide con la creación y crecimiento del mercado.

Existe una extensa literatura académica sobre las teorías explicativas de la infravaloración. Parte de la literatura las clasifica en tres, a saber: modelos de información asimétrica, modelos de información simétrica y un tercer grupo de teorías novedosas. Todas ellas comparten una característica en común: la existencia de una Oferta Pública Inicial (OPI) de valores en la salida a bolsa para fundamentar la infravaloración. Esta cuestión nos llevó a plantearnos como hipótesis de partida que al tratase de un mercado en el que la totalidad de los valores se han incorporado sin la realizaron de una oferta pública inicial de valores, no se produciría un ajuste en el precio en el primer día de

negociación. Sin embargo, los resultados son contrarios a lo esperado y la rentabilidad inicial bruta media del primer día, ajustada por diferentes índices, ha resultado positiva y significativa. Este hecho es especialmente importante ya que constatamos la existencia de un aumento del precio el primer día de negociación en las salidas a bolsa a través de *listing,* cuestión muy escasamente estudiada en otros mercados y no abordada con anterioridad en el mercado español. Aunque la mayor parte de la infravaloración detectada el primer día se resuelve en la apertura, al contrario de lo que sucede en otros mercados, la infravaloración se extiende hasta la tercera jornada. Posiblemente el sistema de fijación de precios por subastas establecido y la baja frecuencia de contratación generan un retardo a la hora de alcanzar el precio de equilibrio y por eso la infravaloración se prolonga más allá del primer día. Así mismo, hemos podido comprobar que la infravaloración se mantiene si segmentamos la muestra entre las SOCIMI que han realizado colocación privada previa y aquellas que no la han realizado. Por tanto, este hecho no afectaría a la conclusión inicial de existencia de infravaloración

Tras evidenciar que existe una infravaloración en el precio fijado por las SOCIMI en las salidas a bolsa, tanto para aquellas que realizaron una colocación privada previa como para las que no, el siguiente objetivo planteado ha sido determinar qué elementos están relacionados con su presencia a partir de las teorías explicativas existentes al respecto que en principio estarían asociadas a la captación de nuevo capital y/o nuevos inversores con la salida, incorporando además otros factores asociados a las peculiaridades tanto de estos vehículos de inversión como del diseño particular del mercado analizado. Los resultados más relevantes alcanzados podrían sintetizarse en que: (i) no hemos obtenido evidencia empírica de que la incertidumbre *ex-ante* sobre el valor de la empresa (tamaño, edad, nivel de endeudamiento y presencia de agentes de prestigio en el proceso de salida) tenga relación con la infravaloración, (ii) dentro de las teorías de señalización, observamos que la proporción de acciones retenidas por los accionistas con cargos ejecutivos es un factor clave para determinar el nivel de infravaloración, (iii) nuestros resultados sugieren que es el clima general de mercado bursátil previo a la incorporación el que está relacionado con la infravaloración y no el específico del sector y (iv) uno de los principales hallazgos de esta investigación reside en que una de las características diferenciadoras del mercado analizado, la fijación por parte de los miembros del consejo de administración de la SOCIMI del precio de referencia para el

inicio de la contratación en base al precio de equilibrio determinado por el valorador, es particularmente relevante para la determinación del nivel de infravaloración.

Tras concluir que, a pesar de que la salida a bolsa no se realiza mediante OPI, sí que observamos el fenómeno de la infravaloración, analizamos el posterior comportamiento de los precios tras la incorporación al mercado mediante la detección de rendimientos anormales negativos tras la salida a bolsa en tres ventanas de estudio de 6, 12 y 24 meses tras el mes en el que se produce la salida, respectivamente. Nuevamente, existe un importante cuerpo de literatura académica sobre el mal comportamiento de los precios de las acciones después de salir a bolsa. Si analizamos las teorías que intentan explicar el rendimiento anormal tras la salida a bolsa, observamos que la parte más clásica se basa en la eficiencia del mercado y/o deficiencias en la metodología. Sin embargo, nuestros resultados presentan la existencia de un rendimiento anormal negativo económica y estadísticamente significativo durante los 24 meses posteriores a la salida a bolsa de las SOCIMI, independientemente de la metodología utilizada. La detección de resultados anormales después de la salida a bolsa es una cuestión crítica, ya que este mal comportamiento de la cotización posterior a la admisión, junto con la evidencia de rendimientos iniciales ajustados positivos y significativos obtenidos en el primer ensayo (*Essay* I) revela que las empresas estaban sobrevaloradas en el momento de la cotización. Cabe señalar que el rendimiento anormal aumenta en los primeros meses después de la cotización, se reduce ligeramente en torno a los meses 11 y 12 (posiblemente debido a la difusión realizada por muchas SOCIMI para cumplir con el requisito de capital mínimo flotante o *free float* mencionado en la Tabla 2 de la Introducción y Resumen de la Tesis Doctoral), y luego esta mala *performance* vuelve a aumentar y continúa hasta el mes 24 tras el inicio de la negociación.

Estos resultados sobre la existencia de un rendimiento anormal tras la salida a bolsa serían consistentes con una amplia parte de la literatura que cuestiona la eficiencia del mercado. La existencia de fricciones o ciertos obstáculos en el mercado impiden el rápido ajuste de los precios ya que dificulta la existencia de inversores institucionales que eliminan todas las desviaciones de precios. La reducida liquidez del mercado analizado, la cual obstaculiza la entrada de inversores instituciones, es una de las principales razones que consideramos provoca el ajuste lento de precios y la existencia de un rendimiento anormal tras la salida a bolsa de las SOCIMI. No obstante, esta sería una cuestión que debería analizarse con más profundidad en futuros estudios.

Los resultados obtenidos sobre los rasgos clave que explican este comportamiento anormal negativo muestran que las teorías comúnmente utilizadas para justificarlo no son relevantes en el caso de las SOCIMI españolas analizadas. Una vez más son el modo en que salen a bolsa las SOCIMI (cotización directa) y las peculiaridades del mercado las que explican este comportamiento post-*listing*. Concretamente, son las SOCIMI que han llevado a cabo una colocación privada previa a la salida a bolsa (hasta 6 meses antes) y aquellas en las que los miembros del consejo de administración fijan un precio de referencia para el inicio de la cotización por encima del precio determinado por el valorador las presentan un peor comportamiento que el de sus homólogas.

Finalmente, la irrupción en nuestro periodo de análisis de una crisis sanitaria mundial como consecuencia de la propagación del coronavirus COVID-19 a lo ancho del planeta y la calificación como una pandemia por la Organización Mundial de la Salud en marzo de 2020, nos ha llevado a realizar nuestro tercer y último ensayo sobre el impacto de la pandemia del COVID-19 durante la primera ola en las SOCIMI en España, ya que se trata de un sector que, por las características de su actividad se ha visto afectado a nivel mundial como así lo muestran algunos estudios recientes en otros mercados. En nuestro país, las duras medidas impuestas por el Gobierno Español desde el primer momento con el confinamiento domiciliario de prácticamente toda la población han impactado directamente a estos vehículos de inversión que, no olvidemos, tienen como propósito principal la tenencia directa o indirecta de activos inmobiliarios para el alquiler. Los resultados obtenidos añaden nuevas aportaciones a la literatura sobre esta crisis sanitaria sin precedentes, puesto que, si bien la *performance* operativa muestra unos resultados similares a otros mercados con un empeoramiento generalizado de la rentabilidad, eficiencia y apalancamiento, no siendo así con la valoración, el comportamiento del mercado nos muestra una menor reacción y más tardía que en otros mercados. Del mismo modo, y a diferencia de otros mercados, observamos que el tipo de propiedad y la incidencia del COVID-19 no influyen de manera significativa ni en el comportamiento global del mercado ni sobre la *performance* operativa. Las diferentes características del mercado analizado, marcadas nuevamente por la reducida liquidez del mismo junto con el diferente tratamiento de la crisis socio-sanitaria en España respecto a otros países comunitarios y extracomunitarios con medidas más restrictivas y comunes a todas las regiones han llevado a resultados diferentes a los obtenidos hasta ahora en otros mercados.

Tras la discusión de los principales resultados y hallazgos obtenidos en la presente Tesis Doctoral, podemos concluir que tomando la evidencia obtenida en su conjunto, los trabajos empíricos nos sugieren que, a pesar de que las pruebas obtenidas respecto a la existencia de infravaloración en la salida a bolsa, la existencia de un rendimiento anormal tras dicha incorporación y el fuerte impacto del COVID-19 en la *performance* operativa de las SOCIMI son coherentes, en parte, con los resultados obtenidos en otros mercados (no siendo así con el impacto a nivel global de la pandemia de COVID-19), los resultados obtenidos están condicionados, principalmente, por las características diferenciadoras del mercado analizado, y, en menor medida, por las características específicas de las empresas a las que va dirigida el estudio. Así, el mecanismo de fijación del precio de referencia para el inicio de la contratación, el tipo de operación realizada para la salida a bolsa, la reducida liquidez del mercado y la composición del capital de estas sociedades son particularmente relevantes en los resultados obtenidos.

Como hemos visto anteriormente, el objetivo central de la Tesis ha sido realizar una estudio empírico sobre el mercado de SOCIMI en España, ya que la reciente incorporación de este tipo de sociedades a la legislación española no había permitido contar con una muestra suficiente de SOCIMI sobre la que realizar estudios de carácter empírico de manera individualizada. Por tanto, la primera contribución de la presente Tesis es que, hasta donde nuestro conocimiento alcanza, se trata de los primeros estudios que analizan (i) el comportamiento del precio en las salidas a bolsa de los REIT en España, (ii) el rendimiento anormal de estos vehículos tras la incorporación al mercado y (iii) el impacto de la pandemia de COVID-19 en los mismos. Asimismo, en relación con la primera de ellas, conviene señalar que analiza la infravaloración descomponiéndola en rentabilidad primaria y secundaria, únicamente estudiada de este modo en los REIT del mercado norteamericano y sobre un periodo completo (2014-2018) post-crisis financiera global sobre el que no se había analizado anteriormente la infravaloración. Además, se analiza por primera vez el rendimiento anormal tras la salida a bolsa en España mediante salida directa o *listing.* Finalmente, hemos creado un índice *ad-hoc* sobre el segmento de SOCIMI del Mercado Alternativo Bursátil para poder analizar el impacto del COVID-19 en el mismo desde una perspectiva bursátil global.

Estos análisis aportan un importante valor a los inversores y analistas, tanto nacionales como internacionales, en sus análisis de oportunidades de inversión sobre un sector relevante y en crecimiento como es el inmobiliario español y sobre un vehículo en

auge, como son las SOCIMI. Asimismo, dota a estas sociedades de nuevas herramientas a la hora de decidir sobre la posible fijación del precio en las salidas a bolsa, la estructura accionarial de la SOCIMI, el momento más idóneo para realizar la incorporación al mercado o el modo en que se incorporan. Por último, permite al regulador conocer el funcionamiento del mercado y el de estos instrumentos de inversión desde otra perspectiva en aras de posibles futuras modificaciones regulatorias.

Somos conscientes de que la Tesis Doctoral presenta ciertas limitaciones. Por un lado, el periodo temporal considerado. El *Essay* I y *Essay* II abarcan los primeros años de funcionamiento del mercado MAB-SOCIMI, hecho que también podría considerarse como una ventaja. No obstante, al no tratarse de un mercado maduro los resultados deberían analizarse teniendo esta cuestión en consideración. El *Essay* III sólo cubre la primera oleada de la propagación del COVID-19 y, por tanto, el análisis está menos influenciado por la intervención política de los gobiernos regionales españoles, ya que durante este periodo estaba centralizado y las medidas impuestas por el gobierno eran las mismas para todo el país. Por otro lado, y como venimos señalando a lo largo de la Tesis, el tamaño de la muestra analizada fruto de la reciente aparición de las SOCIMI en nuestro mercado.

En nuestra opinión, el trabajo realizado aporta provechosa información que permite tener una primera visión sobre algunos de los aspectos más relevantes del mercado de SOCIMI en España. No obstante, la investigación y resultados aquí presentados deja abiertas futuras líneas de investigación que podrían dirigirse a: (i) estudio de las implicaciones del rendimiento anormal tras la salida a bolsa de las SOCIMI en relación con la valoración racional de las acciones, la eficiencia del mercado, el comportamiento de los inversores y la asignación de recursos; (ii) la ampliación del período de la muestra a las diferentes olas de propagación del COVID-19, de modo que el rendimiento operativo durante el segundo semestre de 2020 sea coherente con la expectativa bursátil positiva cuando se inició la desescalada en mayo de 2020. Además, permitiría analizar el impacto de las diferentes medidas impuestas por los gobiernos regionales sobre el rendimiento bursátil y empresarial de las SOCIMI en España. Finalmente, y desde un punto de vista más amplio, la escasa o casi inexisten investigación de las SOCIMI en España, fruto de la reciente creación de este vehículo de inversión en nuestro país, deja un amplio y variado abanico de campos sobre los que explorar. Podríamos mencionar, a título informativo pero no exhaustivo, un análisis más profundo

sobre la liquidez del mercado y la figura del Proveedor de Liquidez e, incluso, el desarrollo de medidas específicas para mejorar la misma, la eficiencia del mercado, el análisis de la calidad de la información publicada según el agente especialista (Asesor Registrado, auditor, etc.) seleccionado por la emisora, la relación entre el cumplimiento de determinados aspectos de gobierno corporativo voluntarios (como la comisión de auditoría) y el rendimiento de la compañía, el análisis de la estructura del capital y su evolución a nivel financiero y bursátil, etc.

Indudablemente, el estudio de este mercado debe continuar, no sólo por razones puramente académicas o científicas sino, sobre todo, por la trascendencia económica que este sector tiene en la economía de nuestro país y el fuerte interés del mismo por parte de la comunidad inversora.