Journal of Economics, Finance and Administrative Science (JEFAS) publishes bi-annually on business research within the areas of operations, supply chain, economics, finance and administration. JEFAS is owned by the Universidad ESAN who have more than 50 years of experience in the higher education field and post graduate studies and desire to contribute to the academic community with the most outstanding pieces of research.

Research papers accepted for publication in JEFAS are double blind refereed to ensure academic rigour and integrity.

EDITOR-IN-CHIEF
Peter Yamakawa
Universidad ESAN, Peru

MANAGING EDITOR
Jorge Guillen
Department of Economics and Finance, Universidad ESAN, Peru
E-mail jguillen@esan.edu.pe

EXECUTIVE EDITOR
Zulema Aimar Caballero

ASSOCIATE EDITORS
Jerry Haar, Ph.D.
Department of Management & International Business,
College of Business, Florida International University, USA

Ajay Manrai Ph.D.
Department of Business Administration, Lerner College of Business and Economics, University of Delaware, USA

Narasimhan Srinivasan, Ph.D.
Marketing, School of Business, University of Connecticut, USA

Jorge Talavera, Ph.D.
Universidad ESAN, Peru

Ajay Vinze, Ph.D.
College of Business, University of Missouri, USA

Jonathan Wareham, Ph.D.
Departamento de Operaciones, Innovación y Data Sciences,
ESADE, SPAIN

ISSN 2077-1886
© 2017 Universidad ESAN, Peru
Av. Alonso de Molina 1652, Surco, Lima-Perú
Apartado postal 1846, Lima 100, Perú
Tel.: (51-1) 317-7200 / (51-1) 712-7200
Fax: (51-1) 345-1328
www.esan.edu.pe
esanediciones@esan.edu.pe
Hecho el Depósito Legal en la Biblioteca Nacional del Perú Nº 99-3242
Impresión
Tarea Asociación Gráfica Educativa
Pasaje María Auxiliadora 156, Breña
Lima, Perú
Tiraje: 250 ejemplares
Guidelines for authors can be found at:
http://www.emeraldgrouppublishing.com/services/publishing/jetas/authors.htm

Journal of Economics, Finance and Administrative Science
Indexed and abstracted in:
The British Library
Cabell’s Directory of Publishing
EconLIT
IDEAS
Latindex
Redalyc
RePEc
Scielo Perú
Ranked by:
Scopus
Licensed by:
Business Source Complete (EBSCO)
Informe Académico (Gale Cengage Learning)
Academic OneFile (Gale Cengage Learning)
Social Science Research Network (SSRN)

Emerald Publishing Limited
Howard House, Wagon Lane,
Bingley BD16 1WA, United Kingdom
Tel +44 (0) 1274 777700; Fax +44 (0) 1274 785201
E-mail emerald@emeraldinsight.com

For more information about Emerald’s regional offices please go to http://www.emeraldgrouppublishing.com/offices

Customer helpdesk:
Tel +44 (0) 1274 785278; Fax +44 (0) 1274 785201
E-mail support@emeraldinsight.com

The Publisher and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher and Editors of the products advertised.

Emerald is a trading name of Emerald Publishing Limited
Printed by CPI Group (UK) Ltd, Croydon, CR0 4YY

The Journal of Economics, Finance and Administrative Science is the new name of our formerly Cuadernos de Difusión. Hence, we are including articles written in both languages, English and Spanish, broadening our scope to a larger audience. The Journal of Economics Finance and Administrative Science aims to provide the most relevant research and current developments in all the fields of the administrative sciences worldwide. In order to accomplish our purpose, the articles go through a rigorous process of evaluation and selection, according to international editorial conventions.

The Universidad ESAN, with more than 50 years of experience in the higher education field and post graduate studies, desires to contribute to the academic community with the most outstanding pieces of research. We gratefully welcome suggestions and contributions from our readers in order to help us hit our goals.

Two issues per year June and December
Editorial

This is the 43rd issue of the *Journal of Economics, Finance and Administrative Science*, edited by Emerald Publishing and indexed to the most prestigious databases, like Scopus. Also, we are ranked in the third percentile in Scimago. This is the result of a rigorous work that takes into account the demanding academic standards.

The first article, “Effects of the celebration of a sporting mega-event on a local economy. The case of The World Games 2013 Cali”, measures the economic impact of an event that attracts many people and mobilizes great resources in this Colombian city.

Along the line with the purpose of our journal in terms of showing topics related to the business area, the article called “People-oriented leadership in call centers” is a study that compares the effect of people-oriented leadership versus those of other types of leadership. This work is focused in call centers characterized by absenteeism and stressfulness.


In addition, the empirical paper “The role of liquidity in asset pricing; the special case of the Portuguese Stock Market” examines liquidity in asset pricing in the tiny market of Portugal.

Then, “The use of the recognition heuristic as an investment strategy in European stock markets” analyses whether recognized stocks produce abnormal returns on a consistent basis. The authors attempt to find a portfolio better than the market portfolio.

Finally, the article “The valuation performance of mathematically-optimized, equity-based composite multiples” tests the valuation precision of composite models in each of six key industries in South Africa. The objective is to ascertain whether equity-based composite multiples models produce more accurate equity valuations than optimal equity-based single-factor multiples models.

These six papers tackle different topics in the areas of Management, Economics and Applied Finance, responding to the commitment of this journal to present new researches that surely will serve as a basis for future analysis. Our purpose is to show the edge of knowledge in the business field worldwide.

Peter Yamakawa T. (Ph.D.)

*Director*
Efectos de la realización de un megaevento deportivo sobre una economía local. El caso de los Juegos Mundiales 2013 Cali

Luis F. Aguado, Ana M. Osorio and Alexei Arbona
Departamento de Economía, Pontificia Universidad Javeriana, Cali, Colombia, y
Jesús C. Peña-Vinces
Business Management, Universidad de Sevilla, Sevilla, España

Resumen
Propósito – En el artículo se presenta una síntesis del impacto sobre la producción y el empleo generado por la realización de un megaevento deportivo en la ciudad de Cali, Colombia.

Diseño/metodología/enfoque – El impacto se estima a través de los efectos sistemáticos producidos por las actividades de inversión/gasto de los agentes identificados y los consecuentes efectos multiplicadores capturados a partir de un modelo insumo-producto.

Hallazgos – La realización de los Juegos Mundiales significó un nuevo flujo de ingreso monetario a la ciudad de Cali, de $101.036 millones de pesos (=53.4 millones de dólares) y se generaron 9.598 puestos de trabajo (=7.711 empleos de tiempo completo). Adicionalmente, se atrae a la ciudad a 2.174 turistas internacionales y 11.250 turistas nacionales.

Originalidad/valor – El artículo aporta aspectos innovadores metodológicamente útiles para futuros estudios de impacto económico en ciudades poco turísticas situadas en países en vías de desarrollo.

Palabras clave – Cali, Colombia, Impacto económico, Los Juegos Mundiales, Megaeventos deportivos

Tipo de artículo – Artículo de investigación

Abstract
Purpose – A summary of the economic impact resulting from the celebration of a sporting mega-event in the city of Cali, Colombia, is carried out in this article.

Design/methodology/approach – The impacts are estimated by means of the systematic effects produced by the activities of investment/expenditure of the identified agents and the consequent multiplying effects captured from an input-output model.

Findings – The World Games represented a new income flow to the city of Cali of $101.036 million pesos (≈ US$53.4 mill.) and 9,598 jobs were created (≈ 7,711 full-time jobs). Additionally, 2,174 foreign tourists and 11,250 national tourists were attracted to the city.

© Luis F. Aguado, Ana M. Osorio, Alexei Arbona and Jesús C. Peña-Vinces. Published in Journal of Economic Finance and Administrative Science. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial & non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licenses/by/4.0/legalcode

JEL classification – L83, C67

The current issue and full text archive of this journal is available on Emerald Insight at: www.emeraldinsight.com/2077-1886.htm
1. Introducción

En el artículo se presentan los resultados del impacto económico a corto plazo, sobre la ciudad de Santiago de Cali[1] y su área metropolitana (en adelante AM), asociado a la celebración de la IX edición de los Juegos Mundiales (World Games). Los Juegos Mundiales están constituidos por las federaciones de disciplinas deportivas que no participan en el programa de los Juegos Olímpicos. La IX edición de los Juegos Mundiales se llevó a cabo entre el 25 de julio y el 4 de agosto de 2013 y ha sido la primera organizada por una ciudad de habla hispana y situada en un país de América del Sur[2]. Los Juegos Mundiales, como megaevento deportivo, involucraron la competición simultánea en 31 disciplinas deportivas[3], el desplazamiento de 2,929 deportistas y de 1,903 delegados de 97 países de los cinco continentes. Adicionalmente, la novedad y la diversidad que implica la presencia de atletas de élite en deportes poco conocidos y practicados como el sumo, el wushu y el korfball, por mencionar algunos en el contexto de América Latina.

El artículo se centra en los impactos producidos por las actividades de inversión/gasto de los agentes identificados en la celebración de los Juegos Mundiales: Comité Local Organizador de Cali (inversión en infraestructura, gasto en logística) y espectadores (gasto en consumo), y los consecuentes efectos multiplicadores capturados a partir de un modelo insumo-producto. Estos impactos se sintetizan en los efectos sobre la producción y el empleo en el área metropolitana de la ciudad, definida como área de impacto.

La inversión para garantizar la infraestructura física deportiva y la organización y logística de los Juegos Mundiales más el gasto de los espectadores ascendió a $140,357 millones de pesos (≈ 74,2 mill. US$)[4]. De este total, $101,036 millones de pesos (≈ 53,4 mill. US$) significaron un nuevo flujo de ingreso monetario derivado de agentes de fuera de Cali y A.M. (Gobierno Nacional; Turistas Extranjeros y Nacionales) que de no haberse realizado Los Juegos Mundiales no hubiese llegado a la ciudad. Adicionalmente, los Juegos Mundiales atrajeron a 2,174 turistas internacionales y 11,250 turistas nacionales. Asimismo, generaron 9.598 puestos de trabajo (≈ 7.711 empleos de tiempo completo) en sectores vinculados con la logística de la organización de los Juegos y con la “turbina de gasto” de los turistas.

Los resultados lucen interesantes para la literatura empírica sobre los estudios de impacto económico de megaeventos deportivos. Por un lado, en el contexto latinoamericano es muy limitada la información de los estudios de esta naturaleza, exceptuando la investigación ex-post para los Juegos Panamericanos de Río de Janeiro 2007, el estudio ex-ante de los Juegos Panamericanos de Guadalajara 2011 y el más reciente para el pasado mundial de fútbol de Brasil. Por otro lado, se presentan elementos innovadores en la metodología seguida. Así, la metodología para determinar los turistas internacionales por vía administrativa ofrece un cálculo directo y, por tanto, realista del flujo de visitantes extranjeros, usualmente sobreestimados en los estudios de impacto económico. En el caso de la estimación de los turistas nacionales, se combina información de una encuesta cara a cara aplicada a los asistentes con información de las entradas vendidas por el Comité Organizador Local. En ambos casos (turistas nacionales e internacionales), se tiene en cuenta el tamaño de los escenarios, la frecuencia de asistencia y la rotación de entradas, lo que hace más precisas las estimaciones.
Adicionalmente, se plantea el limitado alcance de los efectos “expulsión” y de “cancelación de reservas” en ciudades poco turísticas situadas en países en vías desarrollo, lo que incrementa para este tipo de ciudades los beneficios económicos de realizar este tipo de eventos internacionales. El artículo se organiza en siete secciones, la primera es esta introducción. En la segunda y tercera secciones, se caracterizan los Juegos Mundiales como megaevento deportivo y se detalla la metodología empleada en la estimación del impacto económico. En la cuarta sección se presenta la estimación del flujo de espectadores, tanto nacionales como extranjeros. En quinto lugar se estima el impacto económico de los Juegos Mundiales a través de un modelo insumo-producto. En la sexta sección se discute el legado de los Juegos Mundiales para Cali, es decir los efectos de largo plazo esperados por la celebración del megaevento deportivo, los cuales no necesariamente se capturan por las relaciones monetarias implícitas en los modelos insumo-producto. Por último, se presentan las conclusiones.

2. Los Juegos Mundiales como megaevento deportivo

De acuerdo con la literatura de la economía del deporte (Roche, 1994; Llopis-Goig, 2012), los megaeventos deportivos se caracterizan por ser eventos a gran escala con un profundo significado internacional; tener una duración breve y perfectamente acotada; estar organizados por un país o ciudad que generalmente compite por ser sede; atraer un importante número de participantes (deportistas) y espectadores, tanto locales como extranjeros; ser cubiertos por un amplio número de medios internacionales de comunicación; requerir alta inversión en infraestructura, logística y seguridad; y ser regentados por un Comité Local Organizador integrado por autoridades de gobiernos nacionales y locales y organizaciones y federaciones deportivas internacionales.

Los Juegos Mundiales encajan dentro de la tipología de megaevento deportivo (ver Tabla I). En efecto, estos tienen carácter multidisciplinario, un gran número de deportistas y países participantes, se celebran cada cuatro años, son regentados por la Asociación Internacional de los Juegos Mundiales (IWGA)[5]. La literatura de la economía del deporte identifica como megaeventos deportivos a los Juegos Olímpicos, la Copa Mundial de Fútbol (FIFA) y los Juegos Olímpicos de Verano e Invierno y en menor escala los Juegos Panamericanos. Los Juegos Mundiales constituyen un megaevento impulsado por los resultados deportivos —“competitor driven”— que alcancen los deportistas de elite en competencia, frente a aquellos megaeventos impulsados por su alto número de seguidores y espectadores —“spectator driven”— (Gratton et al., 2006, p. 51).

3. Metodología

En el artículo se utiliza la metodología de efectos, propia de los Estudios de Impacto Económico —en adelante EIE—. La literatura empírica de estudios de impacto económico aplicada al sector deportivo está concentrada en países desarrollados situados en Europa, Estados Unidos y Asia. Una aproximación detallada de la metodología empleada, sus limitaciones y aplicaciones se encuentra en: (Baade and Matheson, 2016; Zimbalist, 2015; Barajas et al., 2012; Matheson, 2012; Porter and Chin, 2012; Barget and Gouguet, 2008; Gratton et al., 2006; Matheson, 2006). Para el contexto de América Latina (Devesa et al., 2012; Ávalos, 2011).

El análisis del impacto económico resulta útil para ofrecer una imagen cuantitativa de la actividad económica adicional generada en la ciudad por la celebración de los Juegos Mundiales. Por un lado, referida a la focalización de las inversiones —públicas y privadas— en infraestructura deportiva y urbana y el gasto en gestión y logística para llevar a cabo el
megaevento deportivo. De otro lado, referida a la generación de gasto de los asistentes —
turistas nacionales y extranjeros— en bienes y servicios relacionados con su estadía en la
ciudad. Ambas fuentes de nueva demanda generan un efecto multiplicador sobre la
economía de la ciudad a través de la interrelación sectorial capturada a partir de un modelo
insumo-producto (Schuschny, 2005). La metodología se centra en los efectos sistemáticos
producidos por las actividades de inversión/gasto de los agentes identificados (ver Figura 1).

Es así como la estimación del impacto económico de los Juegos Mundiales 2013 Cali se
lleva a cabo a partir de la suma de tres efectos: directo, indirecto e inducido.

3.1 Efectos directos
Los efectos directos miden los gastos/inversión totales en que incurre el Comité Local
Organizador de Cali, CLOC, nómina de sueldos, bienes y servicios comprados, construcción
y adecuación de infraestructura física deportiva, logística, alquileres, etc. Son obtenidos a
partir de la información suministrada por el Comité Local Organizador discriminada por la
fuente de financiación, gobierno local o entidades del gobierno regional/nacional. Estos
últimos constituyen la inyección de gasto nuevo en el área metropolitana de Santiago de Cali
y no una recomposición del gasto del municipio. Asimismo, un aspecto a considerar en el
análisis del impacto económico de los megaeventos deportivos es el tipo de financiación
usado (Zimbalist, 2010). La financiación vía deuda pública deja compromisos en el mediano
y largo plazo asumibles mediante mayores impuestos y/o recortes del gasto en otros
servicios prestados por el gobierno (local/nacional). Si bien este estudio se enfoca en el corto
plazo, es importante señalar que la financiación de los Juegos Mundiales provino en mayor
medida de recursos del gobierno nacional y no requirió contraer deuda pública por parte del
gobierno local[6].
3.2 Efectos indirectos
Los efectos indirectos miden los gastos que realizan los espectadores en bienes y servicios — compra de entradas, alojamiento, alimentación, transporte local, recuerdos —. Los gastos relevantes son los realizados por los espectadores de fuera del área metropolitana de Santiago de Cali. Desde esta perspectiva, el gasto de los residentes de Cali y AM no constituye una entrada neta de dinero a la economía local, sino una reasignación de su gasto. Este supuesto señala que los residentes en Cali y AM disponen de un presupuesto fijo para sus gastos de recreación y ocio. Por tanto, incluir este gasto puede conducir a sobrestimar los efectos indirectos, error muy común en los estudios de impacto económico (Siegfried and Zimbalist, 2006).

De igual forma, se debe tener presente el posible efecto expulsión provocado por el desplazamiento de público local residente, y/o la cancelación de visitas a la ciudad de turistas (extranjeros/nacionales), para evitar la congestión y los altos precios que supone el exceso de demanda provocado por los espectadores atraídos por la celebración del megaevento deportivo. En el primer caso, la celebración de los Juegos Mundiales representó un evento extraordinario que motivó a los locales a participar como asistentes a las competiciones y a demostrar su hospitalidad a los visitantes internacionales. El segundo caso parece ajustarse más a la realidad de grandes ciudades turísticas en países desarrollados. En la Figura 2 se observa que la demanda adicional de hospedaje provocada por la celebración de los Juegos Mundiales fue perfectamente absorbida por la capacidad hotelera disponible en la ciudad, para los mismos meses de 2014 la tasa de ocupación estuvo alrededor del 50 per cent, por tanto no sería válido concluir que se presentó un efecto desplazamiento y de “cancelación de reservas”.

Para la estimación del número de espectadores y la descripción de su perfil sociodemográfico y de gasto se requirió el uso de varias fuentes de información, entre ellas la colaboración de Migración Colombia[7] y la realización de una encuesta cara a cara aplicada a los espectadores en la entrada/salida y los alrededores de los escenarios deportivos.
3.3 Efecto inducido
El efecto inducido es el efecto combinado de los dos gastos anteriores (Comité Organizador Local y espectadores) sobre el conjunto de la economía local, a través de dos canales, el canal de relaciones intersectoriales (por ejemplo, la construcción de un nuevo escenario deportivo signiﬁca un aumento en la demanda de insumos —ladrillo, aluminio, acero— a otros sectores) y el canal de consumo asociado a los nuevos ingresos que la actividad económica genera (por ejemplo, la contratación de mano de obra —ingenieros, obreros de construcción—, utilidades del sector de obras civiles). Los efectos inducidos son calculados a través de multiplicadores derivados de la Matriz insumo-producto (MIP) para el Valle del Cauca, elaborada por Duque et al. (2013). Esta matriz es la más reciente disponible en la región para este tipo de estudios a falta de una MIP para Cali y AM[8].

La matriz parte de información del valor bruto de la producción, del valor agregado y de la demanda ﬁnal, y utiliza el método RAS para calcular el cuadrante de consumo intermedio (Duque et al., 2013). La matriz calculada es de tipo producto por producto, simétrica, a valores básicos y presentados en pesos constantes de 2005. Se encuentra desagregada en 37 sectores de la economía del Valle del Cauca; sin embargo, para los ﬁnes de este artículo se ha agregado en 18 sectores de acuerdo con las dos grandes fuentes de demanda identiﬁcadas.

4. Estimación del número de espectadores y de su gasto
Los Juegos Mundiales se desarrollaron durante 10 días, los seis últimos del mes de julio y los primeros cuatro del mes de agosto de 2013. Las competiciones tuvieron lugar en 25 escenarios con capacidad para albergar a 108.259 espectadores[9]. Los tres escenarios de mayor capacidad son el Estadio Olímpico Pascual Guerrero (25.486)[10], la Plaza de Toros de Cañaveralejo (19.000) y el Coliseo El Pueblo (18.700) que representan el 58 per cent del total de la capacidad. El 25 de julio se llevó a cabo la ceremonia de inauguración (no hubo competencias) y el 4 de agosto se realizó la ceremonia de clausura. El cálculo de los espectadores requirió usar distintas fuentes de información, a través de un conjunto de matices y especiﬁcaciones que procedemos a explicar.

4.1 La encuesta Asistentes a los Juegos Mundiales 2013 Cali
Se diseñó una encuesta cara a cara[11] aplicada a los espectadores en los sitios de entrada/salida y alrededores de los escenarios de competición, para ello se requirió el apoyo de 56
voluntarios/as de los Juegos que a través de tres reuniones recibieron capacitación en el desarrollo de encuestas cara a cara, un conocimiento profundo de los cuestionarios y de los objetivos de la investigación. Los voluntarios/as se distribuyeron en función de la programación de las competencias y la capacidad de los escenarios. Asimismo, se diseñaron dos modelos de cuestionario: uno dirigido a los turistas extranjeros (en inglés) y otro para los locales, tanto para residentes como para no residentes de Cali y AM. En total, se aplicaron 1.299 encuestas: 508 a turistas extranjeros, 282 a turistas nacionales y 509 a residentes del área metropolitana de Santiago de Cali[12].

La encuesta permitió capturar:
- las características generales de los asistentes, tanto demográficas como socioeconómicas;
- la frecuencia de asistencia a las competencias; es decir, para un mismo individuo, el número medio de competiciones y el número medio de días que asiste;
- la estructura del gasto derivado de la asistencia a las competencias; y
- el motivo de asistencia y grado de satisfacción.

Para cada uno de los anteriores apartados la información distingue entre los tres tipos de espectadores identificados: locales residentes en Cali y AM, turistas nacionales y turistas extranjeros.

4.2 El cálculo de los turistas extranjeros
Gracias al apoyo de Migración Colombia se habilitó temporalmente en el sistema de registro de los diferentes puestos de control migratorio en el país la categoría “Juegos Mundiales” entre el 18 de julio y el 4 de agosto de 2013[13]. Los resultados muestran que en el periodo ingresaron 10.481 extranjeros al país con destino a la ciudad de Cali, de los cuales 7.006 manifestaron que la principal razón para visitar Cali era participar de las actividades asociadas a los Juegos Mundiales, distribuidos así: 4.832 visitantes en calidad de deportistas, jueces, miembros de federaciones deportivas, prensa, invitados especiales, etc. y 2.174 como espectadores/turistas extranjeros.

Esta estrategia para determinar el número de turistas extranjeros resulta novedosa en este tipo de estudios, en la medida en que implica un cálculo directo y preciso del grupo de interés. Usualmente, en la literatura de evaluación de impacto económico se utilizan estimaciones indirectas basadas en encuestas al público asistente y en la ocupación hotelera. Otra ventaja de esta estrategia es que elimina el sesgo de los visitantes casuales, es decir, los espectadores extranjeros que asisten a los Juegos pero su visita a la ciudad es explicada por otra razón distinta a la celebración de los Juegos (visita a familiares, razones de estudio/trabajo).

4.3 Otros aspectos metodológicos clave
La empresa encargada por el Comité Local Organizador de Cali para la venta de las entradas proporcionó el número total de entradas disponibles, las efectivamente vendidas y las de cortesía por día, escenario y disciplina deportiva, incluyendo las ceremonias de inauguración y clausura. Si bien en principio resulta claro que incluir el gasto del público local residente en Cali y AM representa una recomposición de su gasto en el tiempo y en la misma área geográfica, se hace necesario incorporar a aquellos espectadores locales residentes en el área de impacto que pudiendo salir de la ciudad (fuga de gasto) se quedaron, producto de una elección racional, para participar como espectadores por la novedad que significaban los Juegos Mundiales. Este público asistente es capturado a través de la siguiente pregunta de la
encuesta: ¿Ha asistido a otras competiciones internacionales en los últimos tres años? Asimismo, se tiene en cuenta el fenómeno observado de rotación de entradas entre familiares/amigos de la población residente en Santiago de Cali. Este fenómeno es explicado en parte por las largas jornadas de las competiciones y porque la entrada permitía el acceso durante toda la jornada. Así, por ejemplo, una persona usaba la misma entrada en la mañana y otra la usaba en la tarde, a lo largo del mismo día.

4.4. ¿Cuántos espectadores presencieron los juegos mundiales 2013 Cali?
La anterior información y refinamientos metodológicos permitieron convertir el número total de entradas (vendidas + cortesía) en número total de asistentes por tipo de residencia que se muestran en el Figura 3. Esta metodología de estimación del número de espectadores también se puede calificar de novedosa en los estudios de impacto económico. En efecto, conociendo el número de espectadores internacionales, a partir de la encuesta se puede estimar el número de turistas nacionales y de espectadores residentes en Cali y AM, a través de la pregunta sobre el “motivo de asistencia”. Además, la información de la encuesta permite corregir el número de entradas vendidas por la frecuencia de asistencia, es decir, por el número medio de competiciones vista por cada tipo de espectador. De esta forma, se convierte el número de entradas en número de espectadores, lo que asegura evitar cometer un error muy común en los estudios de impacto económico de sobreestimar el número de asistentes, que en muchos estudios rebasa la capacidad de los escenarios de competencia y/o la capacidad hotelera local.

**Figura 3.**
Número de espectadores* que presenciaron los Juegos Mundiales 2013 Cali

<table>
<thead>
<tr>
<th>Tipo de Asistente</th>
<th>Cantidad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceremonia Inaugural y Clausura***</td>
<td>50,540</td>
</tr>
<tr>
<td>Residentes en Cali y área metropolitana**</td>
<td>90,249</td>
</tr>
<tr>
<td>Turistas Nacionales</td>
<td>11,250</td>
</tr>
<tr>
<td>Turistas Internacionales</td>
<td>2,174</td>
</tr>
</tbody>
</table>

**Notas:** *Corresponde al número de espectadores corregido por la frecuencia de asistencia. Es decir, teniendo presente que un mismo espectador asiste a distintas competiciones a lo largo de los días de celebración de los Juegos; **incluye corrección por el número de residentes de Cali que compartieron la entrada, con ello se aumentó el número de personas que disfrutaron de las competiciones; ***incluye corrección para evitar la duplicación de asistentes que presenciaron ambas ceremonias

**Fuente:** Elaboración propia sobre la base de la Encuesta Asistentes a los Juegos Mundiales 2013 Cali e información de Migración Colombia
En resumen, los Juegos Mundiales 2013 Cali fueron vistos en vivo en los distintos escenarios deportivos por 103,673 personas (ver Figura 3), de las cuales 2,174 fueron turistas internacionales, 11,250 turistas nacionales y 90,249 residentes en Cali y AM. Asimismo, 50,540 espectadores presenciaron las ceremonias de inauguración y clausura. El perfil de los asistentes a los Juegos Mundiales 2013 Cali indica que se trata de un espectador de mediana edad, en su mayoría hombres, casados o en unión libre y con educación universitaria (ver Tabla II). En el caso de los turistas extranjeros, el rango de edad que más asistió fue entre los 30 y 39 años (29,6 per cent), el 64,8 per cent son hombres, el 51,7 per cent de estado civil con algún vínculo formal (casado/unión libre) y el 80 per cent cuenta con titulación universitaria. Asimismo se trata, en el caso del turista internacional, de un espectador especializado y con experiencia. En efecto, para el caso del 41,3 per cent de los turistas extranjeros su trabajo/estudio está vinculado con actividades deportivas y el 71,1 per cent ha asistido a eventos deportivos internacionales en los últimos tres años. Para los turistas nacionales los residentes en Cali estos porcentajes caen fuertemente, indicando con ello, en parte, que se trata de espectadores más motivados por la novedad de las disciplinas deportivas y la experiencia de asistir a un evento deportivo de escala mundial. Por nivel de ingresos mensuales, la mayoría de los espectadores tiene ingresos de entre $1,200,000 [US $635] y $3,600,000 [US$1,904].

4.5 Estimación del gasto de los espectadores
La estructura de gasto de los espectadores, en especial de aquellos que vienen de fuera de la ciudad atraídos por la celebración de los Juegos, depende de un conjunto de factores, entre ellos: la duración de la estancia en la ciudad y del número de competiciones a las que asista, del tipo de alojamiento y el sistema de transporte que utilicen en la ciudad. La duración de la estadía en la ciudad por parte de los turistas extranjeros es en promedio de 4,8 días y asisten en promedio a 4,4 competiciones en los diez días de duración de los Juegos (Figura 4). En el caso de los turistas nacionales la estancia media es de 4,1 días y una media de asistencia a 4,0 competiciones. La participación como asistente a eventos deportivos dinamiza la interacción social que se refleja en estilos de vida compartidos. En efecto, los turistas extranjeros asisten con un promedio de 4,5 acompañantes frente a 3,9 y 3,6 de los turistas nacionales y asistentes locales, respectivamente.

El 58,3 per cent de los turistas extranjeros se hospeda en hoteles, cerca del 13 per cent en pensiones/hostales y el 23,3 per cent en casa de familiares/amigos (Figura 5). Por su parte, el 58,4 per cent de los turistas nacionales usó como principal forma de alojamiento la casa de familiares/amigos y el 30,6 per cent se aloja bien sea en hoteles o pensiones/hostales. Las anteriores cifras permiten ilustrar cómo cada subgrupo de espectadores tiene una estructura de gasto diferente. Para los efectos de la estimación tomamos como criterio de clasificación del gasto el lugar de residencia.

La Tabla III muestra el gasto total por tipo de espectador, excluyendo el gasto en entradas, que fue suministrado por la empresa encargada de su venta ($4,137 mill. de pesos), lo que permite identificar las actividades económicas más beneficiadas por la “turbina de gasto” asociada a los Juegos. Este gasto constituye la inyección total de recursos a través del consumo que dinamiza los sectores vinculados al turismo como la alimentación, la hotelería, el transporte y el comercio local. De igual forma se beneficia el Estado a través de una mayor recaudación de impuestos derivados de las distintas transacciones.

5. Impacto económico
El objetivo de este apartado es presentar los resultados de la estimación del impacto económico de los Juegos Mundiales sobre la economía de Cali y AM. El impacto
<table>
<thead>
<tr>
<th>Variables</th>
<th>Turista Extranjero</th>
<th>Turista Nacional</th>
<th>Residente en Cali y área metropolitana</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rango de Edad (años)</strong></td>
<td>18-24</td>
<td>25-29</td>
<td>30-39</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.2%</td>
<td>17.2%</td>
<td>29.6%</td>
</tr>
<tr>
<td></td>
<td>17.2%</td>
<td>17.8%</td>
<td>20.2%</td>
</tr>
<tr>
<td></td>
<td>13.9%</td>
<td>13.1%</td>
<td>25.3%</td>
</tr>
<tr>
<td></td>
<td>18-24</td>
<td>25-29</td>
<td>30-39</td>
</tr>
<tr>
<td></td>
<td>12.5%</td>
<td>9.7%</td>
<td>26.3%</td>
</tr>
<tr>
<td></td>
<td>25.7%</td>
<td>27.9%</td>
<td>23.6%</td>
</tr>
<tr>
<td></td>
<td>25.7%</td>
<td>27.9%</td>
<td>23.6%</td>
</tr>
<tr>
<td><strong>Sexo</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hombre</td>
<td>64.8</td>
<td>61.6</td>
<td>56.2</td>
</tr>
<tr>
<td>Mujer</td>
<td>35.2</td>
<td>38.4</td>
<td>43.8</td>
</tr>
<tr>
<td><strong>Estado civil</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soltero</td>
<td>44.1</td>
<td>44.1</td>
<td>37.0</td>
</tr>
<tr>
<td>Casado/unión libre</td>
<td>51.7</td>
<td>49.0</td>
<td>56.3</td>
</tr>
<tr>
<td>Viudo/divorciado</td>
<td>4.1</td>
<td>6.9</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Nivel educativo</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ninguno</td>
<td>0.2</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Primaria</td>
<td>0.4</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Secundaria</td>
<td>10.2</td>
<td>6.9</td>
<td>11.5</td>
</tr>
<tr>
<td>Técnico</td>
<td>9.1</td>
<td>11.8</td>
<td>12.7</td>
</tr>
<tr>
<td>Universitaria/Postgrado</td>
<td>80.0</td>
<td>80.0</td>
<td>74.6</td>
</tr>
<tr>
<td><strong>Su trabajo/estudios están relacionados con</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>la actividad deportiva</strong></td>
<td>41.3</td>
<td>41.3</td>
<td>41.3</td>
</tr>
<tr>
<td><strong>Ha asistido a otras competiciones internacionales en los últimos 3 años</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Si</td>
<td>71.1</td>
<td>46.1</td>
<td>40.2</td>
</tr>
<tr>
<td>Actividad principal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estudiar</td>
<td>9.6</td>
<td>13.5</td>
<td>12.1</td>
</tr>
<tr>
<td>Trabajar</td>
<td>81.1</td>
<td>77.1</td>
<td>74.3</td>
</tr>
<tr>
<td>Oficios del hogar</td>
<td>0.7</td>
<td>4.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Buscar trabajo</td>
<td>1.1</td>
<td>0.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Jubilado</td>
<td>3.7</td>
<td>3.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Otra</td>
<td>3.9</td>
<td>2.0</td>
<td>1.6</td>
</tr>
</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Variables</th>
<th>Turista Extranjero</th>
<th>Turista Nacional</th>
<th>Residente en Cali y área metropolitana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nivel de ingresos mensuales (pesos colombianos)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$600,000</td>
<td>10.3</td>
<td>8.2</td>
<td>11.4</td>
</tr>
<tr>
<td>$601,000-$1,200,000</td>
<td>15.7</td>
<td>15.5</td>
<td>17.7</td>
</tr>
<tr>
<td>$1,201,000-$2,400,000</td>
<td>19.0</td>
<td>23.7</td>
<td>23.3</td>
</tr>
<tr>
<td>$2,401,000-$3,600,000</td>
<td>19.7</td>
<td>21.6</td>
<td>16.8</td>
</tr>
<tr>
<td>$3,601,000-$4,800,000</td>
<td>16.2</td>
<td>13.5</td>
<td>11.0</td>
</tr>
<tr>
<td>$4,801,000-$6,000,000</td>
<td>7.9</td>
<td>8.6</td>
<td>8.9</td>
</tr>
<tr>
<td>&gt;$6,001,000</td>
<td>11.4</td>
<td>9.0</td>
<td>11.0</td>
</tr>
</tbody>
</table>

Elaboración propia sobre la base de la Encuesta Asistentes a los Juegos Mundiales 2013 Cali. Elaboración propia.
económico se mide como la suma de tres efectos. En primer lugar, los efectos directos derivados del gasto/inversión en que incurrió el Comité Local Organizador de Cali para garantizar la celebración de los Juegos. En segundo lugar, los efectos indirectos, derivados del gasto que los espectadores de los Juegos realizan en la ciudad, en la medida en que son inherentes al hecho de su celebración. Por último, los efectos inducidos derivados de la dinámica que genera el impulso de las dos demandas anteriores, vía relaciones intersectoriales (compras a otros sectores) y de consumo (nuevos ingresos), sobre toda la economía local.

5.1 Efecto directo
El efecto directo incluye todos los gastos/inversiones necesarios para poner en marcha los Juegos Mundiales. En este caso se consideran dos grandes fuentes de gasto/inversión por parte del Comité Local Organizador de Cali[14]:

![Gráfico 4. Duración media de la estancia, número medio de competiciones y acompañantes de los asistentes a los Juegos Mundiales 2013 Cali](image)

Elaboración propia sobre la base de la Encuesta Asistentes a los Juegos Mundiales 2013 Cali

![Gráfico 5. Tipo de hospedaje de los asistentes a los Juegos Mundiales 2013 Cali](image)

Elaboración propia sobre la base de la Encuesta Asistentes a los Juegos Mundiales 2013 Cali
- la inversión en construcción de nuevos escenarios deportivos y la adecuación y remodelación de los ya existentes;
- el gasto en preparación, gestión y logística.

La inversión en construcción y adecuación de infraestructura deportiva para llevar a cabo los **Juegos Mundiales** fue un esfuerzo tripartito entre los gobiernos local, departamental y nacional. El esfuerzo del gobierno local corresponde al 44.2 per cent del total de la inversión (Tabla IV), el gobierno nacional apoyó con el 48 per cent y el gobierno departamental con cerca del 8 per cent.

Siguiendo la metodología adoptada en este estudio, para evitar cometer un error ampliamente documentado en los estudios de impacto económico, la inversión de la Alcaldía de Santiago de Cali en escenarios deportivos se excluye del efecto directo, dado que no puede ser considerada como una nueva inyección de recursos en el área de impacto de los Juegos. Esta constituye una transferencia de los mismos residentes locales en forma de gasto público local, frente a otros usos potenciales de estos recursos. Finalmente, como inyección de nuevos recursos financieros al área de impacto, en este caso Cali y AM, ingresaron $24.175 millones de pesos correspondientes al apoyo de los gobiernos nacional y departamental.

El gasto en operación y logística para la realización de los Juegos se muestra en el Tabla V. La información se presenta en las partidas que utiliza el **Comité Olímpico Colombiano (COC)**. En total los recursos ascienden a $66.255 millones de pesos financiados en su totalidad por el gobierno nacional en cabeza de Coldeportes[15]. El gasto en operación y logística de acuerdo con la metodología adoptada, para tener en cuenta solo la inyección de recursos provenientes de fuera del área de impacto y que benefician a los agentes locales (sectores productivos locales), requiere ajustes en tres partidas:
- contratos internacionales, puesto que corresponden a equipos importados alquilados para los procesos de medición y cronometraje en las competencias;

<table>
<thead>
<tr>
<th>Tipo de Consumo</th>
<th>Turista Extranjero</th>
<th>Turista Nacional</th>
<th>Residente Cali y A.M.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alojamiento</td>
<td>$1,248,753,461</td>
<td>$3,154,258,391</td>
<td>$0</td>
<td>$4,403,003,852</td>
</tr>
<tr>
<td>Alimentación</td>
<td>$713,253,218</td>
<td>$1,900,539,906</td>
<td>$7,738,784,649</td>
<td>$10,352,571,773</td>
</tr>
<tr>
<td>Transporte Local</td>
<td>$534,951,751</td>
<td>$1,252,874,373</td>
<td>$5,101,579,580</td>
<td>$6,889,405,703</td>
</tr>
<tr>
<td>Compras/Recuerdos</td>
<td>$574,170,087</td>
<td>$1,015,911,937</td>
<td>$4,136,692,156</td>
<td>$5,726,774,180</td>
</tr>
<tr>
<td>Ocio/Diversión</td>
<td>$852,810,232</td>
<td>$599,430,261</td>
<td>$2,074,349,251</td>
<td>$3,436,589,745</td>
</tr>
<tr>
<td>Total</td>
<td>$3,923,930,749</td>
<td>$7,833,008,867</td>
<td>$19,051,405,636</td>
<td>$30,808,345,252</td>
</tr>
</tbody>
</table>

**Tabla III.**
Gasto total de los espectadores [cifras en pesos 2013]

<table>
<thead>
<tr>
<th>Tipo de Consumo</th>
<th>Turista Extranjero</th>
<th>Turista Nacional</th>
<th>Residente Cali y A.M.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alojamiento</td>
<td>$1,248,753,461</td>
<td>$3,154,258,391</td>
<td>$0</td>
<td>$4,403,003,852</td>
</tr>
<tr>
<td>Alimentación</td>
<td>$713,253,218</td>
<td>$1,900,539,906</td>
<td>$7,738,784,649</td>
<td>$10,352,571,773</td>
</tr>
<tr>
<td>Transporte Local</td>
<td>$534,951,751</td>
<td>$1,252,874,373</td>
<td>$5,101,579,580</td>
<td>$6,889,405,703</td>
</tr>
<tr>
<td>Compras/Recuerdos</td>
<td>$574,170,087</td>
<td>$1,015,911,937</td>
<td>$4,136,692,156</td>
<td>$5,726,774,180</td>
</tr>
<tr>
<td>Ocio/Diversión</td>
<td>$852,810,232</td>
<td>$599,430,261</td>
<td>$2,074,349,251</td>
<td>$3,436,589,745</td>
</tr>
<tr>
<td>Total</td>
<td>$3,923,930,749</td>
<td>$7,833,008,867</td>
<td>$19,051,405,636</td>
<td>$30,808,345,252</td>
</tr>
</tbody>
</table>

Elaboración propia sobre la base de la Encuesta Asistentes a los Juegos Mundiales 2013 Cali

**Tabla IV.**
Inversión en infraestructura deportiva (cifras en pesos de 2013)

<table>
<thead>
<tr>
<th>Entidad</th>
<th>Obra civil</th>
<th>Interventoria</th>
<th>Total</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcaldía Santiago de Cali</td>
<td>$18,163,169,691</td>
<td>$955,956,300</td>
<td>$19,119,125,990</td>
<td>44.2</td>
</tr>
<tr>
<td>Gobernación del Valle del Cauca</td>
<td>$3,220,000,000</td>
<td>$170,000,000</td>
<td>$3,390,000,000</td>
<td>7.9</td>
</tr>
<tr>
<td>Gobierno Nacional [Coldeportes]</td>
<td>$19,735,863,587</td>
<td>$1,038,729,662</td>
<td>$20,774,593,249</td>
<td>48.0</td>
</tr>
<tr>
<td>Total</td>
<td>$41,129,033,277</td>
<td>$2,164,685,962</td>
<td>$43,293,719,239</td>
<td>100</td>
</tr>
</tbody>
</table>

**Fuente:** Comité Local Organizador de Cali - Secretaría del Deporte, Alcaldía de Santiago de Cali
tecnología y servicios de transmisión de televisión, en ambos casos solo se incluye el gasto realizado en el área de impacto (gastos locales por parte de los técnicos), y manejo administrativo, en lo correspondiente a la devolución de los derechos de inscripción del equipo de Gimnasia de Israel que no se presentó.

Asimismo, se excluyeron los convenios —canje— con el Masivo Integrado de Occidente – MIO– para el transporte de los voluntarios y con EMCALI para suministro de servicios públicos y comunicaciones.

Una vez realizados los ajustes, como inyección de nuevos recursos financieros al área de impacto ingresaron $57.445 millones de pesos. En las Tablas 8, 9 y 10 se presenta la información homologada con los sectores de la Matriz insumo-producto (MIP) para el Valle del Cauca. En resumen, el efecto directo asociado a la celebración de los Juegos Mundiales 2013 Cali signifi có una inyección de $81.620 millones de pesos a la economía de Cali y AM, representados por $24.175 millones de pesos de inversión en infraestructura deportiva y $57.445 millones de pesos en gastos de operación, gestión y logística[16].

5.2 Efecto indirecto
La estimación del número de espectadores efectuada en el apartado 4.5. se refina al incluir residentes locales que no se desplazaron a otro lugar debido precisamente a la celebración de los Juegos (ver la Figura 6). Se trata de una equivalencia entre individuos que decidieron quedarse en su casa y asistir a los eventos programados en lugar de desplazarse de vacaciones a otro lugar, producto de una elección racional. El cálculo se ha realizado con ayuda de la pregunta consignada en la Encuesta a Asistentes sobre si ha asistido a otras competencias internacionales en los últimos tres años:

| Tabla V. Gasto en gestión, logística y organización (cifras en pesos de 2013) |
|---------------------------------|------------------|------|
| Concepto                         | Valor            | (%)  |
| Implementación                  | $11.962.898.607  | 18.1 |
| Contratos internacionales        | $8.376.422.862   | 12.6 |
| Tecnología                       | $5.862.516.211   | 8.8  |
| Hoteles                          | $5.422.557.519   | 8.2  |
| Gastos administrativos           | $4.573.791.131   | 6.9  |
| Alimentación                     | $4.461.985.231   | 6.7  |
| Promoción                        | $3.866.146.939   | 5.8  |
| Recurso humano                   | $3.620.796.721   | 5.8  |
| Montaje                          | $3.329.738.754   | 5.0  |
| Manejo administrativo            | $3.286.534.087   | 5.0  |
| Transporte                       | $2.594.802.981   | 3.9  |
| Plan de medios                   | $2.025.572.397   | 3.1  |
| Inauguración/clusura             | $2.000.000.000   | 3.0  |
| Otras /bucete/aerears logísticas | $1.892.106.901   | 2.9  |
| Protocolo                        | $672.045.813     | 1.0  |
| Voluntariado                     | $551.180.928     | 0.8  |
| Deportes                         | $451.717.489     | 0.8  |
| Dopaje                           | $430.857.684     | 0.7  |
| Aérea médica                     | $283.569.969     | 0.5  |
| Medio ambiente                   | $219.828.700     | 0.3  |
| Total                            | $66.255.127.503  | 100  |

Fuente: Comité Local Organizador de Cali

- tecnología y servicios de transmisión de televisión, en ambos casos solo se incluye el gasto realizado en el área de impacto (gastos locales por parte de los técnicos), y
- manejo administrativo, en lo correspondiente a la devolución de los derechos de inscripción del equipo de Gimnasia de Israel que no se presentó.
El supuesto subyacente indica que quienes responden afirmativamente siguen la actividad deportiva, disponen de los recursos financieros para desplazarse pero deciden quedarse en la ciudad para seguir las competiciones del deporte de su interés y/o por la novedad que implican los Juegos Mundiales.

Adicionalmente, el 97% de los espectadores residentes en Cali y AM considera que la celebración de los Juegos Mundiales 2013 Cali generó un impacto positivo sobre el “orgullo y sentido de pertenencia de los caleños por su ciudad” Tal como lo ha puesto de manifiesto Zimbalist (2010) para los residentes locales este tipo de celebraciones es un momento “corto pero intenso” a través del cual “la atención del mundo se centrará en sus hogares” lo que a corto plazo genera “una gran sensación de logro”.

La Tabla VI muestra el efecto indirecto asociado a la inyección de gasto adicional en Cali y AM derivado de los espectadores de los Juegos Mundiales. Un total de $19.416 millones de pesos que resultan de la suma del gasto de los turistas extranjeros y nacionales, y el gasto de los residentes locales que se quedaron en la ciudad para presenciar las competiciones.

<table>
<thead>
<tr>
<th>Tipo de espectadores</th>
<th>Número de espectadores</th>
<th>Gasto medio por persona</th>
<th>Gasto total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turistas extranjeros</td>
<td>2.174</td>
<td>$1.805.237</td>
<td>$3.924.586.128.93</td>
</tr>
<tr>
<td>Turistas nacionales</td>
<td>11.250</td>
<td>$696.242</td>
<td>$7.832.724.858.48</td>
</tr>
<tr>
<td>Residentes locales</td>
<td>36.280</td>
<td>$211.099</td>
<td>$7.658.665.065.52</td>
</tr>
</tbody>
</table>

Elaboración propia

Tabla VI
Estimación del efecto indirecto (cifras en pesos de 2013)
5.3 Efecto total sobre la producción

Una vez descritos y estimados los efectos directos e indirectos, resulta clave analizar cómo estas fuentes de demanda inicial se irrigan hacia los distintos sectores productivos para conocer y determinar el efecto o impacto total sobre el sistema económico local. Una parte de esa demanda directa que perciben las empresas locales constituye fuente de nueva demanda en forma de compras a otras empresas e individuos, que les proveen los insumos necesarios para realizar su producción (efecto indirecto), este aumento de la producción a su vez genera nuevos ingresos, que inducen nuevas rondas de gasto y aumento de la producción y así sucesivamente (efecto inducido), hasta llegar al efecto total sobre el sistema económico.

El resultado generado en la simulación, al introducir el cambio en la demanda final por $101.036 millones de pesos derivados de las dos fuentes de demanda identificadas: $81.620 millones de pesos (infraestructura y logística) más $19.416 millones de pesos (gasto de espectadores) generó un impacto total acumulado de $569.493 millones de pesos sobre la economía de la ciudad de Cali y AM medido a través del valor bruto de la producción y utilizando los multiplicadores de producción tipo II (ver Tabla VII). Como puede apreciarse en la Tabla VII, el impacto sobre la producción recae sobre tres sectores (72,9 per cent) donde se concentra el gasto en logística de los Juegos (servicios a las empresas, 28,01 per cent), la inversión en infraestructura deportiva (construcción, 23,38 per cent) y la “turbina de gasto” de los espectadores (hostelería, 21,55 per cent).

<table>
<thead>
<tr>
<th>Sector</th>
<th>Descripción</th>
<th>Inyección de nuevos recursos [Mill. $]</th>
<th>Impacto sobre la producción Mill. $ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicios a las empresas</td>
<td>[p.e. gastos en gestión del CLOC; montaje y adecuación de escenarios; interventoria obras civiles; alquiler de equipos de medición y cronometraje; transport e de equipos; servicios de vigilancia]</td>
<td>$27.803</td>
<td>$159.497 28.01</td>
</tr>
<tr>
<td>Construcción y reparación de edificaciones</td>
<td>[p.e. inversión en infraestructura de escenarios]</td>
<td>$22.966</td>
<td>$133.122 23.38</td>
</tr>
<tr>
<td>Alojamiento, suministro de comidas y bebidas</td>
<td>[p.e. gasto de los espectadores en alojamiento y alimentación]</td>
<td>$20.110</td>
<td>$122.739 21.55</td>
</tr>
<tr>
<td>Otra industria manufacturera</td>
<td>[p.e. gasto en uniformes de voluntarios]</td>
<td>$11.748</td>
<td>$46.899 8.24</td>
</tr>
<tr>
<td>Servicios de transporte</td>
<td>[p.e. gasto en transporte local de los turistas y delegaciones]</td>
<td>$6.563</td>
<td>$38.807 6.81</td>
</tr>
<tr>
<td>Servicios de esparcimiento</td>
<td>[p.e. gasto de los espectadores en ocio/diversión, boletería]</td>
<td>$4.249</td>
<td>$25.839 4.54</td>
</tr>
<tr>
<td>Comercio y servicios de reparación</td>
<td>[p.e. gasto de los espectadores en compras de recuerdos]</td>
<td>$3.253</td>
<td>$19.536 3.43</td>
</tr>
<tr>
<td>Servicios financieros e inmobiliarios</td>
<td>[p.e. gasto en arrendamiento sedes, bodegas]</td>
<td>$1.808</td>
<td>$10.873 1.91</td>
</tr>
<tr>
<td>Correo y telecomunicaciones</td>
<td>[p.e. gasto en promoción y medios de comunicación]</td>
<td>$1.115</td>
<td>$6.755 1.19</td>
</tr>
<tr>
<td>Maquinaria y equipo de transporte</td>
<td>[p.e. gasto en compra PC, impresoras, celulares, etc.]</td>
<td>$1.421</td>
<td>$5.428 0.95</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$101.036</td>
<td>$569.493 100</td>
</tr>
</tbody>
</table>

Tabla VII
Impacto de los Juegos Mundiales 2013 Cali sobre la producción de Cali y AM

Elaboración propia
5.4 Efecto sobre el empleo

En cuanto al empleo, el cambio en la demanda final por $101,036 millones de pesos creó un total de 9,598 puestos de trabajo (ocupados), equivalentes a 7,711 empleos de tiempo completo (ver Figura 7)[17]. De estos últimos, 1,775 son causa directa del impulso inicial de demanda (empleos directos), 1,013 son empleos indirectos, derivados de los incrementos en la demanda de otros sectores productivos y 4,923 inducidos asociados a los nuevos efectos sobre los propios proveedores vía ingresos y consumo.

La Tabla VIII muestra el empleo por sectores económicos. Los sectores que más empleo generaron, en términos relativos, fueron los vinculados con la logística de la organización de

<table>
<thead>
<tr>
<th>Sector</th>
<th>Descripción</th>
<th>Número de empleos Ocupados</th>
<th>Equivalente de tiempo completo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comercio y servicios de reparación</td>
<td>[p.e. gasto de los espectadores en compras de recuerdos]</td>
<td>3,085</td>
<td>2,479</td>
</tr>
<tr>
<td>Servicios de transporte</td>
<td>[p.e. gasto en transporte local de los turistas y delegaciones]</td>
<td>1,355</td>
<td>1,089</td>
</tr>
<tr>
<td>Producción agropecuaria, silvicultura y pesca</td>
<td>[p.e. demanda derivada]</td>
<td>935</td>
<td>751</td>
</tr>
<tr>
<td>Alojamiento, suministro de comidas y bebidas</td>
<td>[p.e. gasto de los espectadores en alojamiento y alimentación]</td>
<td>772</td>
<td>620</td>
</tr>
<tr>
<td>Construcción y reparación de edificaciones</td>
<td>[p.e. gastos en infraestructura de escenarios]</td>
<td>636</td>
<td>511</td>
</tr>
<tr>
<td>Servicios de enseñanza y salud de mercado</td>
<td>[p.e. gasto de logistica en el 'bacute' 'aerea medica y manejo de dopaje]</td>
<td>558</td>
<td>448</td>
</tr>
<tr>
<td>Servicios de esparcimiento</td>
<td>[p.e. gasto de los espectadores en ocio/ diversion, boletería]</td>
<td>482</td>
<td>387</td>
</tr>
<tr>
<td>Servicios a las empresas</td>
<td>[p.e. gastos en gestion del CLOC; montaje y adecuacion de escenarios; interventoria obras civiles; alquiler de equipos de medicion y cronometraje; transporte de equipos; servicios de vigilancia]</td>
<td>481</td>
<td>387</td>
</tr>
<tr>
<td>Otra industria manufacturera</td>
<td>[p.e. gasto en uniformes de voluntarios]</td>
<td>383</td>
<td>307</td>
</tr>
<tr>
<td>Servicios del gobierno</td>
<td>[p. ej. demanda derivada]</td>
<td>240</td>
<td>190</td>
</tr>
<tr>
<td>Correo y telecomunicaciones</td>
<td>[p.e. gasto en promocion y medios de comunicacion]</td>
<td>234</td>
<td>188</td>
</tr>
<tr>
<td>Industria alimenticia</td>
<td>[p. ej. demanda derivada]</td>
<td>200</td>
<td>161</td>
</tr>
<tr>
<td>Industria financiera e inmobiliarios</td>
<td>[p.e. gasto en arrendamiento sedes, bodegas]</td>
<td>143</td>
<td>115</td>
</tr>
<tr>
<td>Maquinaria y equipo de transporte</td>
<td>[p.e. gasto en compra PC, impresoras, celulares, etc.]</td>
<td>42</td>
<td>34</td>
</tr>
<tr>
<td>Trabajos de construccion, construccion de obras civiles y servicios de arrendamiento de equipo con operario</td>
<td>[p.e. demanda derivada]</td>
<td>28</td>
<td>22</td>
</tr>
<tr>
<td>Electricidad, gas, agua y saneamiento b'bacute'aélico</td>
<td>[p.e. demanda derivada]</td>
<td>23</td>
<td>19</td>
</tr>
<tr>
<td>Productos de mineria</td>
<td>[p.e. demanda derivada]</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>9,598</td>
<td>7,711</td>
</tr>
</tbody>
</table>

Tabla VIII. Impacto sobre el empleo por sectores económicos

Efectos de la realización de un megaevento deportivo
los Juegos y la “turbina de gasto” de los turistas. Es así como en el sector comercio y servicios de reparación se generaron 2.479 empleos equivalentes de tiempo completo, seguidos del sector de servicios de transporte con 1.089, el sector de producción agropecuaria, silvicultura y pesca con 751 y el sector de alojamiento, suministro de comidas y bebidas con 620.

6. El legado de los Juegos Mundiales para Cali
De acuerdo con Ron Froehlich, presidente de International World Games Association (IWGA) los pasados Juegos Mundiales 2013 Cali son “la mejor de las nueve versiones de los Juegos, por eso la medalla de oro es para Cali y Colombia[18]”. Este éxito inicial de los Juegos Mundiales 2013 Cali no garantiza que en el largo plazo los efectos positivos se mantengan. Lo que podemos denominar “el legado de los Juegos”, depende de un conjunto complejo de factores e interacciones que no son capturados por las relaciones monetarias entre agentes y sectores que se describen en la Figura 4. Con el objetivo de que perdure la ventaja competitiva generada por la realización del megaevento deportivo, se requiere de una adecuada gestión por parte de los actores clave (sector público —local, regional, nacional—, sector deportivo, las empresas privadas y la comunidad) que mitigue los riesgos identificados (ver la Tabla IX).

La Figura 8 propone una interacción estratégica entre los actores clave (stakeholders) que pueden dinamizar “el legado de los Juegos”. Los actores clave arriba identificados a través de una adecuada interacción y adopción de un conjunto de acciones son quienes garanticen el sostenimiento en el largo plazo de los impactos positivos de los Juegos. En la Figura 4 se presentan en forma sucinta algunas de las acciones relevantes, que implican algo más allá de una actitud de colaboración entre los actores locales clave, significa que realmente se comparten experiencias, recursos y capacidades para adquirir, desarrollar y consolidar ventajas competitivas en la organización de megaeventos deportivos dentro de una visión estratégica global de gestión del territorio; al respecto, ver Radicchi (2012, pp. 38-39).

7. Conclusiones
En este artículo se estimó el impacto económico a corto plazo asociado a la celebración de la IX edición de los Juegos Mundiales sobre la ciudad de Cali y su área metropolitana. En
**Impactos Positivos de Largo Plazo: El Legado de los Juegos**

**Capital Físico/Infraestructura**: infraestructura física para la realización de eventos deportivos de escala mundial

**Capital Humano/Social**: profesionales capacitados en áreas relacionadas con la realización de grandes eventos deportivos. Beneficios sociales del Programa de Voluntarios”. Beneficios sociales de la nueva infraestructura deportiva y la diversidad en la práctica deportiva que posibilitan “Marca de Ciudad”: mejora en la percepción y posicionamiento de la ciudad en el contexto nacional e internacional como ciudad “deportiva, moderna y competitiva”

**Intangible**: Aumento del sentido de identidad, pertenencia, autoestima y cohesión social

**Riesgos**

- Los escenarios deportivos se deterioran físicamente; las adecuaciones y remodelaciones sin mantenimiento y actualización permanente se vuelven obsoletas. Además de que representan una carga para el presupuesto público local/nacional
- La experiencia de los profesionales vinculados con la organización y logística, asimismo de los voluntarios, se puede subutilizar en la medida en que no puedan aplicar su experiencia con la organización y oferta de otros eventos de gran escala
- Sin promoción y apoyo a la práctica del deporte recreativo y competitivo el uso de las instalaciones deportivas se puede desviar para otros fines. Sin que ello implique que la nueva infraestructura deportiva no se incorpore dentro del equipamiento cultural y social de la ciudad para el uso y disfrute del tiempo libre de los residentes y visitantes de Cali
- Sin una gestión adecuada de la Marca de Ciudad se pueden perder los beneficios positivos asociados con la buena imagen para la ciudad que deja el éxito deportivo y de asistencia a los Juegos Mundiales como potencial destino turístico de futuros visitantes

**Notas**: *La convocatoria para voluntarios recibió la inscripción de 5.872 personas, se capacitaron 5.366 y finalmente se seleccionaron 2.539; **Por ejemplo, como legado de los Juegos Mundiales quedan nuevos deportes incluidos en el sistema nacional, entre ellos: batalla de fuerza; baile deportivo y escalada. Elaboración propia*

conocimiento de los autores, este sería el primer estudio de esta naturaleza aplicado a un megaevento deportivo en Colombia. En resumen, la celebración de los Juegos Mundiales significó para la ciudad de Cali:

- **En lo económico**, la movilización de recursos que dinamizó diversos sectores de la economía local: 2.174 turistas internacionales, 11.250 turistas nacionales, 9.598 puestos de trabajo equivalentes a 7.711 empleos de tiempo completo.
- **En lo deportivo**, una oportunidad para continuar consolidando y explotando las ventajas competitivas que ha adquirido en la realización de eventos deportivos de escala mundial.
- **En lo social**, exaltar el sentido de pertenencia y el orgullo de los residentes locales por su ciudad, a través de la celebración de un megaevento deportivo excepcional, inédito en América Latina. Noventa y siete de cada 100 espectadores residentes en Cali y AM consideraron que la celebración de los Juegos Mundiales tuvo un efecto positivo sobre el “orgullo y sentido de pertenencia de los caleños por su ciudad”.

**Tabla IX.**

Efectos de la celebración de un megaevento deportivo

149
El principal aporte del artículo se centra en el desarrollo de algunos puntos que resultan metodológicamente útiles en la elaboración de estudios de impacto económico en ciudades de países en desarrollo. En efecto, en el cálculo del flujo de espectadores (nacionales y extranjeros) se refina la estimación teniendo presente:

- El cálculo directo vía administrativa de los turistas extranjeros, a través de un acuerdo con la autoridad migratoria colombiana, lo que implica un cálculo preciso del grupo de interés.
- Se corrige el posible “efecto expulsión” y de “cancelación de reservas”.
- Se incluyeron aquellos espectadores locales, residentes en el área de impacto, que ante el costo de oportunidad de salir de la ciudad (fuga de gasto) optó por quedarse y presenciar los Juegos.
- Se corrige el número de espectadores al incluir el fenómeno observado de rotación de entradas entre familiares/amigos de la población residente en Santiago de Cali.

Por último, desde una perspectiva de largo plazo, el principal legado de los Juegos se dirige a consolidar las ventajas competitivas que ha adquirido la ciudad en la organización de megaeventos deportivos. En el marco de una visión estratégica global de gestión del territorio, resulta necesaria una fluida interrelación entre los actores locales clave (sector público, sector privado, sector deportivo y comunidad).
Notas


2. Los primeros Juegos Mundiales se realizaron en 1981 en la ciudad de Santa Clara (Estados Unidos). Desde entonces ocho ciudades han sido sede: Londres (Reino Unido), Karlsruhe (Alemania), La Haya (Países Bajos), Lahti (Finlandia), Akita (Japón), Duisbur (Alemania) y Kaohsiung (China). La próxima edición en 2017 se llevará a cabo en la ciudad de Wroclaw (Polonia).

3. Adicionalmente, cinco disciplinas deportivas participaron como invitadas.


6. La estrategia de financiación de los Juegos Mundiales implicó la construcción de cinco nuevos escenarios en terrenos del municipio y/o públicos; los demás escenarios fueron adaptados y remodelados para las competiciones. La financiación recayó sobre el gobierno nacional (Coldeportes) tanto para infraestructura como para la logística. El aporte del gobierno de Cali se estima en un 44,2 per cent para la infraestructura construida.


8. La elaboración de una MIP para Cali y AM constituía un esfuerzo que sobrepasa los alcances de este artículo por los altos requerimientos de información y tiempo necesarios para su construcción, y revela la falta de una contabilidad regional y local en Colombia. La utilización de la MIP actualizada para el Valle del Cauca constituye la mejor aproximación disponible para el cálculo de los multiplicadores, puesto que la estructura económica de Cali refleja la estructura económica del Valle del Cauca. Lo anterior se observa en el peso relativo de Cali y AM en el PIB del Valle del Cauca, que asciende al 67,9 per cent (DANE, 2013).

9. Los escenarios se utilizaron en forma simultánea, aunque no todos los días. Por ejemplo, el Estadio Olímpico Pascual Guerrero se utilizó del 28 al 30 de julio para las competencias de disco volador y del 1 al 2 de agosto para rugby 7.

10. Corresponde a las tribunas habilitadas para presenciar las competiciones y no a la capacidad total del estadio.

11. El sistema de encuesta elegido fue la entrevista personal cara a cara. Este sistema tiene sus ventajas, con un entrevistador entrenado, una vez que se aborda al entrevistado y este acepta la realización de la misma, es difícil que la encuesta no sea válida ya que el número de preguntas contestadas es prácticamente del 100 per cent. No obstante, tiene el inconveniente de realizarse en un momento próximo al disfrute del evento por parte del entrevistado, lo que la hace difícil y costosa.

12. El diseño muestral siguió el procedimiento sugerido por Levy and Lameshow (1991) aceptando un error muestral del 5 per cent y un nivel de confianza del 95 per cent. Las 1,299 encuestas constituyen una muestra representativa del total de espectadores de los Juegos Mundiales 2013 Cali, estratificada según el origen (turistas extranjeros, turistas nacionales y residentes en Cali y AM).
13. Por razones de deficiente infraestructura de transporte terrestre, ferroviario y fluvial en el país y la topografía del territorio se estima como mínima y no significativa la llegada de turistas extranjeros por otra vía distinta del trasporte aéreo.

14. Las diferentes partidas de la inversión en infraestructura, los gastos de organización y logística y el gasto de los espectadores se homologa en los sectores económicos en los que se desagrega la matriz insumo producto del Valle del Cauca, utilizada en la simulación. Se emplean deflactores implícitos calculados a partir de las Cuentas Departamentales y de las Cuentas Trimestrales del DANE.

15. El Departamento Administrativo del Deporte, la Recreación, la Actividad Física y el Aprovechamiento del Tiempo Libre –Coldeportes– es el ente oficial del Estado colombiano “encargado de formular, coordinar y vigilar la práctica del deporte, la recreación, la educación física, el aprovechamiento del tiempo libre y la actividad física, orientados al mejoramiento de la calidad de vida de la sociedad colombiana”, ver [www.coldeportes.gov.co/].

16. En este total se incluye el ingreso por venta de entradas que de acuerdo con la contabilidad del CLOC se incorporó en el presupuesto general de los juegos.

17. Los empleos de tiempo completo equivalente se calculan como el total de horas trabajadas dividido el promedio anual de horas trabajadas en puestos de trabajo considerados de tiempo completo. De acuerdo con el DANE, los empleos (u ocupados) hacen referencia al contrato explícito o implícito entre una persona y una unidad institucional para realizar un trabajo a cambio de remuneración, durante un periodo definido o hasta nuevo aviso, y se dividen en dos grandes grupos: los asalariados y los independientes. Estos trabajos pueden ser de tiempo completo, medio tiempo o empleos ocasionales.


Referencias


DANE (2013), Metodología Para Calcular el Indicador de Importancia Económica Municipal, DANE, Bogotá.


Corresponding author
Luis F. Aguado can be contacted at: lfaguado@javerianacali.edu.co

For instructions on how to order reprints of this article, please visit our website: www.emeraldgrouppublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com
Liderazgo orientado a la gente en call centers

Federico R. León
Universidad San Ignacio de Loyola, Lima, Perú

Oswaldo Morales
Universidad ESAN, Lima, Perú

Juan D. Ramos

Álvaro Goyenechea
HRB, Lima, Perú

Paul A. Rojas
Pontificia Universidad Católica del Perú, Lima, Perú

José Meza
Ejército del Perú, Lima, Perú, y

Andrés Burga-León
Universidad de Lima, Lima, Perú

Resumen

Propósito – Los call centers generan estrés y ausentismo en el personal y la literatura sugiere que el liderazgo orientado a la gente es el tipo adecuado de supervisión para tal situación. Este estudio comparó sus efectos versus los de otros tipos de liderazgo.

Metodología – Datos de ausentismo de 379 representantes de servicios al cliente de un call center peruano fueron analizados y los representantes respondieron a un cuestionario sobre el Marco de Valores en Competencia y sus cuatro tipos de liderazgo. Turnos diurnos y nocturnos de trabajo fueron comparados.

Resultados – Se observó que el ausentismo declina con el liderazgo orientado a la gente, aunque solo en el turno diurno, y la adición de liderazgos orientados al cambio, los resultados y el control resta validez a los modelos.

Limitaciones/implicancias – Futuros estudios deberán abarcar el desempeño del trabajador. Los hallazgos sugieren una necesidad de volver a poner el foco teórico en las contingencias ambientales que afectan la eficacia del liderazgo.

Originalidad/valor – Teóricos del liderazgo se preguntarán en qué circunstancias es efectivo el liderazgo múltiple. Gerentes de call centers apreciarán el valor organizacional del liderazgo orientado a la gente en el primer nivel de supervisión.
Abstract

**Purpose** – Call centers generate stress and absenteeism in staff and the literature suggests that people-oriented leadership is the right way of supervision for such a situation. This study compared its effects versus those of other types of leadership.

**Methodology** – Absentee data of 379 representatives of customer services of a Peruvian call center were analyzed and the representatives answered a questionnaire about the Framework of Values in Competition and its four types of leadership. Day and night work shifts were compared.

**Results** – It was observed that absenteeism declines with people-oriented leadership, although only during the day shift, and the addition of leadership oriented to change, results and control devalues models.

**Limitations/implications** – Future studies should cover the performance of the worker. The findings suggest a need to re-focus the theoretical focus on environmental contingencies that affect leadership effectiveness.

**Originality/value** – Leadership theorists will ask themselves in what circumstances the multiple leadership is effective. Call center managers will appreciate the organizational value of people-oriented leadership at the first level of supervision.

**Keywords** Personnel management, Organizational theory and behaviour, Call center, Absenteeism, People-oriented leadership, Framework of values in competition

**Paper type** Research paper

1. Introducción

Este artículo aborda las relaciones entre el tipo de liderazgo del supervisor de call centers y el nivel de ausentismo de sus subordinados. Hacia fines del siglo pasado, el call center subcontratado era una nueva forma de organización del trabajo que crecía rápidamente gracias a la combinación de mejoras en la tecnología de computación y costos reducidos de telecomunicaciones. Mientras que los call centers en casa son una unidad específica dentro de una organización mayor que puede estar enfocada en otro asunto de negocios (manufactura, comercio minorista, etc.), los call centers subcontratados son manejados por firmas que se especializan en proveer servicios para compañías externas. Las investigaciones iniciales se centraron en los sistemas de empleo coercitivos que adoptaban estos call centers (Kinnie et al., 2000). El trabajo en call centers fue caracterizado como “una línea de ensamblaje en la cabeza” (Taylor and Bain, 1999) y asemejado a un “panóptico” que controlaba virtualmente cada aspecto del comportamiento del trabajador (Fernie and Metcalf, 1998). En esa época, los call centers parecían estar obsesionados con el control. Sin embargo, junto a organizaciones que enfatizaban un modelo de producción masiva tipificado como un juego de tareas repetitivas, rutinarias y altamente encriptadas, Batt and Moynihan (2002) identificaron call centers caracterizados por un modelo de servicios profesionales que maximizaba la discreción y autonomía de los empleados. Desde entonces, un buen número de estudios ha expuesto los beneficios que surgen de la implementación de prácticas administrativas de alto compromiso con el personal (Clark, 2007; D’Cruz and Noronha, 2011; Harney and Jordan, 2008; Malhotra and Mukherjee, 2004; Schalk and Van Rijckevorsel, 2007; Schawfeli et al., 2009), junto con la creación de ambientes de trabajo de punta que buscan comunicar “valores humanos” en call centers de producción masiva (Barnes, 2007).
Se espera que el representante de servicios al cliente (RSC) de un *call center* satisfaga ciertos estándares respecto del tiempo que le toma resolver la pregunta de un cliente, lo que incluye un tiempo hablando y un tiempo en espera, y que provea una solución para el cliente en la primera llamada. En cada llamada, el RSC debe asegurarse no solo que cada cuestión planteada por un cliente sea correctamente respondida sino también que él/ella está hablando con el cliente correcto y los detalles de la conversación son correctamente guardados por el sistema. Los *call centers* usan procedimientos estandarizados y procesos basados en *software* de tecnología de información como la implementación de mensajes pregrabados, dejar que el cliente interactúe con el sistema de información vía teclas telefónicas, y facilitar la comunicación de dos vías entre el computador y el cliente usando mensajes sintéticos (Schalk and van Rijckevorsel, 2007). Un factor común es el alto grado de estrés entre los RSC porque las tareas de trabajo y las interacciones con los clientes imponen sobrecarga de rol y conflicto de rol (Cordes and Dougherty, 1993; Singh et al., 1994; Witt et al., 2004). Wegge et al. (2006) describieron los desafíos específicos planteados por la organización del trabajo (posturas físicas, trabajo en turnos, malfuncionamiento del computador, altos niveles de bulla) y atención dividida entre demandas (escuchar y hablar, digitar datos y leer la pantalla). El conflicto de rol surge de las demandas de ser rápido y simultáneamente proporcionar un servicio de alta calidad; de allí que con frecuencia coisionen el procesamiento de clientes y su satisfacción. El conflicto también surge de las emociones negativas que aparecen cuando un cliente se queja y la obligación de manifestar sentimientos positivos (Deery et al., 2002, 2010; Grandey et al., 2004; Marcoux, 2012). Además, la intensidad de la monitorización automatizada del rendimiento incrementa el peso emocional (Holman et al., 2002) y su propósito percibido afecta la satisfacción laboral (Welles et al., 2007). Así, la regla es encontrar altas tasas de tardanzas, ausentismo, y rotación del personal en la industria del *call center* (Hutchinson et al., 2000; Kleemann and Matuschek, 2002; Malhotra and Mukherjee, 2004; Rose, 2002; Schalk and van Rijckevorsel, 2007). Síntomas psicológicos y físicos frecuentemente intermedian la conexión estrés-ausentismo (Darr and Johns, 2008). Se debe notar que la tardanza es vista generalmente como una forma de ausentismo y se ve esto último como una forma de conducta de retraimiento que precede al retiro (Berry et al., 2012; Call et al., 2015; Deery et al., 2002). Usando una muestra nacional representativa de *call centers* en los Estados Unidos de Norteamérica, Batt (2002) halló menores tasas de renuncias en establecimientos que enfatizaban la participación del personal en las decisiones y en grupos. El *coaching* del supervisor (Liu and Batt, 2010) y sus acciones de apoyo (Liaw et al., 2010) infuuyen positivamente sobre el desempeño de los empleados en *call centers*. El primer objetivo de la presente investigación fue poner a prueba una hipótesis que se infiere de esta revisión de la literatura:

**H1.** El liderazgo orientado a la gente (LOG) del supervisor de *call center* está asociado con niveles reducidos de ausentismo de los subordinados.

### 1.1 Teorías de liderazgo

El LOG tiene una larga historia que comienza en los años 1940/50 con el movimiento de "relaciones humanas", ha sido parte de la importante teoría administrativa situacional de Hershey and Blanchard (1969), y ha reaparecido en el Marco de Valores en Competencia (Cameron et al., 2006; Hartnell et al., 2011; Quinn and Rohrbaugh, 1983).

La literatura organizacional de décadas recientes ha estado dominada por las teorías transformacional y transaccional del liderazgo (Bryman et al., 2011). Usando el liderazgo transformacional, el gerente convence a su personal de que debe transcender sus propios
intereses en pro de la organización mientras que eleva las necesidades de los empleados desde preocupaciones por la sobrevivencia y la seguridad hasta preocupaciones por los logros y la autorrealización. Con el liderazgo transaccional, el gerente enfatiza recompensas extrínsecas y motiva a los subordinados mediante acuerdos contractuales para perseguir metas organizacionales, mientras se minimiza la ansiedad en el ámbito laboral y se cumplen las aspiraciones de los subordinados. El liderazgo LMX comienza como un intercambio transaccional y evoluciona hacia un intercambio transformacional. Una limitación mayor de estas teorías es que no especifican los impactos de las variables situacionales y de contexto sobre la eficacia del liderazgo (Yukl, 2011). Sus opuestos teóricos son las teorías situacionales del liderazgo, las cuales proponen que la gerencia eficaz requiere un estilo específico de liderazgo para una situación específica. Hershey and Blanchard (1969), manejando los conceptos tradicionales de liderazgo conocidos como “iniciación de estructura” y “consideración” (Hemphill and Coons, 1957), postularon que algunas situaciones demandan que el líder priorice la definición de roles de los subordinados, dé instrucciones definidas, cree patrones organizacionales, y establezca canales formales de comunicación, mientras que otras situaciones exigen un énfasis mayor en el despliegue de preocupación por el otro, intentos de reducir conflictos emocionales, esfuerzos de búsqueda de relaciones armoniosas, y una regulación efectiva de participación igualitaria. “Consideración” es equivalente a LOG. El nivel de madurez profesional y psicológica de los empleados determinaría el estilo de liderazgo correcto. Pero los fracasos empíricos de la teoría de Hershey and Blanchard (Bass, 2008; Thompson and Vecchio, 2009) han conducido a una paralización de las investigaciones sobre influencias situacionales en el liderazgo efectivo.

Una teoría situacional que también involucra al LOG es el Marco de Valores en Competencia (Cameron et al., 2006; Hartnell et al., 2011; Quinn and Rohrbaugh, 1983). El MVC es un modelo de culturas organizacionales que consiste en el cruce ortogonal de un factor estructural de estabilidad y control versus flexibilidad y discreción, y un factor de foco internamente orientado y de integración de las personas versus una orientación externa y de diferenciación de las mismas. El cruce origina cuatro tipos de organización donde prevalecen valores de cooperación, creación, competición, o control (Figura 1). El MVC guía la especificación de los roles de liderazgo de acuerdo a valores mutuamente exclusivos que definen la amplitud de comportamiento con la cual podría actuar un gerente (Quinn et al., 1992). Uno de los pares de valores o capacidades contrastadas concierne al foco organizacional, es decir, si se prioriza resultados o relaciones (el eje horizontal en la Figura 1). El segundo par, que refleja el énfasis en la estabilidad o flexibilidad de la estructura organizacional, contrasta conductas que crean continuidad versus cambio (el eje vertical). Debido a que se ve a los cuadrantes opuestos como mutuamente excluyentes, su coexistencia en un gerente individual

**Figura 1.**
La tipología de valores en competencia de Quinn y Rohrbaugh (1983) y Cameron et al. (2006)

Liderazgo orientado a la gente

157
representa una paradoja. El MVC es una teoría situacional porque enfatiza la dificultad inherente de abordar demandas en competencia y ofrece una estructura teórica de los comportamientos requeridos para satisfacer las demandas de cada cuadrante. LOG y liderazgos orientados al cambio, los resultados y los procesos, respectivamente, serían requeridos por las culturas de cooperación, creación, competición, y control del MVC (Lawrence et al., 2009).

Sin embargo, habría un rasgo de complejidad comportamental del gerente que le permitiría lograr desempeños exitosos a través de los cuadrantes del MVC. Se define la complejidad de comportamiento como la capacidad de un líder dado para involucrarse en un amplio repertorio de conductas (Hooijberg and Quinn, 1992). De manera más precisa, esta complejidad es “la habilidad para exhibir comportamientos contrarios u opuestos (siempre que sean apropiados o necesarios) manteniendo al mismo tiempo cierta medida de integridad, credibilidad, y dirección” (Denison et al., 1995, p. 526). El concepto de complejidad comportamental sugiere que es posible para un líder trascender las paradojas del MVC. Un líder conductualmente complejo puede mantener al mismo tiempo la continuidad y dirigir el cambio, así como trascender la paradoja de los resultados versus las relaciones. En suma, tal líder sería capaz de satisfacer las necesidades organizacionales múltiples y en competencia y tener éxito a través de culturas organizacionales (Lawrence et al., 2009). La pregunta que sigue naturalmente es si un supervisor de call center que es orientado a la gente obtiene mejores comportamientos de sus subordinados si al mismo tiempo es capaz de ejercer liderazgos orientados al cambio, los resultados y los procesos.

*H2.* En el call center, la suma de los liderazgos MVC orientados al cambio, los resultados y los procesos del supervisor se asocia con caídas del ausentismo de sus subordinados, con independencia de su liderazgo orientado a la gente.

1.2 Turnos anormales de trabajo

Turnos anormales de trabajo son aquellos que difieren del tradicional turno diurno, es decir, cualquier trabajo que ocurre entre las 7 p.m. y las 6 a.m. (Costa, 2003). Se ha encontrado una asociación sistemática entre turnos anormales de trabajo y problemas de los trabajadores en términos de salud física o mental, seguridad, vida social y desempeño laboral (Saksvik et al., 2010). Se colige que los trabajadores en turnos anormales de trabajo están más necesitados de un líder que los apoye, es decir, una supervisión orientada a la gente, que aquellos en turnos diurnos.

*H3.* El LOG del supervisor de call center, pero no la suma de los otros tipos de liderazgo del MVC, se asocia con reducciones del ausentismo de los subordinados en turnos anormales en mayor medida que con aquellos en turnos diurnos.

La presente investigación pone a prueba las hipótesis 1, 2, y 3 bajo el supuesto de que las relaciones entre las variables abordadas son básicamente constantes a través de los contextos nacionales en que operan los call centers.

2. Método

2.1 Contexto

La organización estudiada (Org) es parte de un conglomerado internacional de servicios situado segundo en el ranking mundial y tiene 15 por ciento del mercado latinoamericano de call centers. Org ha operado en el Perú durante más de 10 años proporcionando empleo a más
de 5,000 trabajadores en Lima Metropolitana. Los empleados se dividen entre una división Móviles Exterior dedicada a atender a una compañía telefónica de otro país sudamericano y una división que tiene clientes de varios campos (banca, seguros, gobierno, etc.). La división Móviles Exterior exhibe un promedio de ausentismo de 7.9 por ciento que representa una pérdida de 5.5 por ciento de su ingreso.

2.2 Participantes
Los 728 RSC de la división Móviles Exterior de Org fueron invitados a participar en una encuesta en línea. Todos ellos tenían responsabilidades tanto de llamar a clientes como de responder a ellos. Sus códigos de empleado sirvieron para relacionar sus respuestas a sus datos personales y de trabajo en los archivos de personal de Org.

2.3 Mediciones
2.3.1 Ausentismo. Org mide el ausentismo de sus empleados usando un marcador de asistencia, control de vacaciones y administración de dispensas médicas. El indicador se refiere a ausencias no certificadas.

2.3.2 Cultura organizacional. El Instrumento de Evaluación de la Cultura Organizacional (IECO) incluye seis ítems que se refieren al rasgo dominante de la organización, el tipo de liderazgo, la administración del personal, el énfasis estratégico, el factor unificador y el criterio de éxito. Cada ítem del IECO típicamente solicita al participante distribuir 100 puntos entre las cuatro opciones de respuesta que representan a las cuatro culturas del MVC (Cameron and Quinn, 1999). Las estructuras psicométrica y factorial del IECO han sido evaluadas en diversos contextos con resultados positivos (Choi et al., 2010; Pierce, 2004), Albarracin and de Lema (2011) y Ramos et al. (2007) han presentado resultados latinoamericanos. Sin embargo, se ha demostrado en el Perú que pedir al participante la elección de una de las cuatro opciones de respuesta —en lugar de distribuir 100 puntos— proporciona descripciones más nítidas y válidas de la cultura organizacional (León et al., 2017). En la presente investigación, se usó este procedimiento y, así, la respuesta elegida fue calificada con 1 y cada una de las otras tres opciones fue calificada con 0.

2.3.3 Liderazgo del supervisor. Lawrence et al. (2009) desarrollaron un instrumento de medición de la complejidad comportamental del líder en el contexto del MVC (CVFMBI, por sus siglas en inglés). Sus análisis produjeron cuatro factores equivalentes a los cuatro cuadrantes del MVC. El LOG, requerido por la cultura de cooperación implica motivar la participación, desarrollar al personal, y reconocer sus necesidades. El liderazgo orientado al cambio requerido por la cultura de creación implica anticipar las necesidades del cliente, iniciar cambios significativos, e inspirar a la gente para que exceda las expectativas. El liderazgo orientado a los resultados requerido por la cultura de competición implica enfocarse en la competición, mostrar una fuerte ética del trabajo y enfatizar la rapidez. El liderazgo orientado a los procesos requerido por la cultura de control implica clarificar políticas, esperar un trabajo preciso, y controlar los proyectos. Se obtuvo una versión española del CVFMBI a través de la traducción de ida y vuelta del inglés de los 36 ítems del cuestionario, a razón de nueve por orientación del liderazgo.

2.3.4 Otras variables. Otros datos usados en la investigación incluyeron género, edad, nivel de educación, número de hijos, turno, y número de horas trabajadas.

2.4 Estrategia analítica
Los puntajes de ausentismo en Org estuvieron sesgados hacia la derecha; la estadística de Kolgomorov-Smirnov reveló al nivel de significación $p < 0.001$ que la distribución no era
normal. Tampoco fueron normales los puntajes de liderazgo. De allí que fue necesario utilizar bootstrapping en todos los análisis estadísticos. Para la prueba de las hipótesis se utilizó regresiones múltiples en ocho modelos que contenían desde una hasta ocho variables.

3. Resultados
3.1 Análisis preliminares
El 64,8% del personal de Móviles Exterior de Org es femenino. A su vez, la diferencia de género es mayor en el turno diurno que en los turnos anormales ($p = 0.05$); es decir, proporcionalmente hay más hombres en los turnos de la tarde y de la noche que en el de la mañana. Los 728 RSC tenían información sobre ausentismo, 390 respondieron a los seis ítems del IECO, y 379 llenaron completamente el CVFMBI. Quienes no respondieron al CVFMBI presentaban mayor ausentismo ($0,049$) que quienes respondieron ($0,043$), una diferencia significativa ($t = -2.118, p = 0.035$). La diferencia en ausentismo entre el turno de la mañana ($0,040$) y los de la tarde/noche ($0,046$) no fue significativa ($t = -1.700, p = 0.090$).

Org fue descrita por los RSC como desbalanceada en términos de cultura. Predominan valores de cooperación, mientras que los valores de creación están menos desarrollados que los de competición y control (Figura 2). Dados estos resultados, el MVC sugeriría que el liderazgo orientado a la gente es la orientación supervisora con mayor probabilidad de éxito y la orientación al cambio la de menor probabilidad de éxito en Org.

En un análisis de factores confirmatorio de los 36 ítems del CVFMBI usando R (R Core Team, 2015) con el paquete Lavaan (Lavaan, 2012), un gran factor latente de complejidad comportamental y cuatro subfactores latentes de LOG y liderazgos orientados al cambio, los resultados y los procesos emergieron con las cargas factoriales que aparecen en la Figura 3. Los indicadores de ajuste del modelo fueron regulares (Tucker-Lewis Index = 0.920) o muy buenos (Root mean square error of approximation = 0.027; standardized root mean square residual = 0.035) de acuerdo a criterios convencionales (Schreiber et al., 2006). La suma de nueve puntajes de ítem por factor produjo puntajes por factor de alta confiabilidad en cuanto a consistencia interna; los $\alpha$ van desde 0.940 hasta 0.968, mientras que el $\alpha$ de la escala de 36 ítems para el turno de la mañana fue 0.985 y por la tarde/noche 0.983. Los puntajes usados en los análisis subsiguientes son tres, correspondientes a LOG, la suma de los otros liderazgos del MVC.
(cambio + resultados + procesos), y la suma de los cuatro liderazgos (complejidad comportamental).

La Tabla I presenta las medias, desviaciones estándar y correlaciones entre las variables de estudio en el turno de la mañana y la Tabla II en los de la tarde y noche. El tiempo en Atento (14 meses) sugiere una tasa de rotación de personal muy alta en Org. La única diferencia significativa observada entre los dos tipos de turno se refiere al número de hijos, mayor para los empleados del turno diurno ($t = 2.001, p = 0.045$). Se puede notar que el ausentismo correlaciona negativamente con la edad, el número de horas trabajadas, y el tiempo en Org, mientras que los dos puntajes de liderazgo están altamente correlacionados entre sí pero ostentan correlaciones bajas con las otras variables.

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable</th>
<th>Media</th>
<th>DE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Edad (años)</td>
<td>24.59</td>
<td>7.25</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>2</td>
<td>Nivel de educación</td>
<td>1.09</td>
<td>0.29</td>
<td>−0.005</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>3</td>
<td>Número de hijos</td>
<td>0.44</td>
<td>0.76</td>
<td>0.504</td>
<td>0.086</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>4</td>
<td>Horas trabajadas</td>
<td>7.86</td>
<td>2.03</td>
<td>0.085</td>
<td>0.041</td>
<td>0.035</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>5</td>
<td>Tiempo en Org (meses)</td>
<td>14.38</td>
<td>8.16</td>
<td>0.172</td>
<td>0.015</td>
<td>0.153</td>
<td>−0.008</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>6</td>
<td>Orientación a personas</td>
<td>35.13</td>
<td>7.74</td>
<td>−0.026</td>
<td>−0.082</td>
<td>−0.041</td>
<td>−0.197</td>
<td>−0.140</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>7</td>
<td>Otros liderazgos</td>
<td>107.4</td>
<td>21.63</td>
<td>−0.083</td>
<td>−0.049</td>
<td>−0.058</td>
<td>−0.118</td>
<td>−0.151</td>
<td>0.835</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>8</td>
<td>Ausentismo</td>
<td>0.04</td>
<td>0.04</td>
<td>−0.049</td>
<td>0.159</td>
<td>0.124</td>
<td>−0.043</td>
<td>−0.161</td>
<td>−0.139</td>
<td>−0.034</td>
<td>−</td>
</tr>
<tr>
<td>9</td>
<td>Género (M = 1, H = 2)</td>
<td>1.32</td>
<td>0.47</td>
<td>−0.117</td>
<td>0.119</td>
<td>−0.233</td>
<td>−0.052</td>
<td>−0.146</td>
<td>0.021</td>
<td>0.070</td>
<td>−0.027</td>
</tr>
</tbody>
</table>

Elaboración propia
### Tabla III.

Coe
cfi
cientes estandarizados de regresión del ausentismo sobre otras variables del estudio, según modelo de regresión, en el turno de la mañana (N = 180)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Modelos de regresión</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>LOG</td>
<td>-0.14+</td>
</tr>
<tr>
<td>Otros liderazgos</td>
<td>0.27*</td>
</tr>
<tr>
<td>Edad</td>
<td>-0.04</td>
</tr>
<tr>
<td>Nivel de educación</td>
<td>0.14</td>
</tr>
<tr>
<td>Número de hijos</td>
<td>0.18</td>
</tr>
<tr>
<td>Horas trabajadas</td>
<td>-0.09</td>
</tr>
<tr>
<td>Tiempo en Org</td>
<td>-0.19*</td>
</tr>
<tr>
<td>Género</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Notas: *p < 0.10; **p < 0.05; ***p < 0.01; ****p < 0.001, bootstrapped. Elaboración propia

### Tabla IV.

Coe
cfi
cientes estandarizados de regresión del ausentismo sobre otras variables del estudio, según modelo de regresión, en los turnos de tarde y noche (N = 180)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Modelos de regresión</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>LOG</td>
<td>0.01</td>
</tr>
<tr>
<td>Otros liderazgos</td>
<td>0.05</td>
</tr>
<tr>
<td>Edad</td>
<td>-0.17**</td>
</tr>
<tr>
<td>Nivel de educación</td>
<td>0.07</td>
</tr>
<tr>
<td>Número de hijos</td>
<td>0.06</td>
</tr>
<tr>
<td>Horas trabajadas</td>
<td>-0.26**</td>
</tr>
<tr>
<td>Tiempo en Org</td>
<td>-0.26***</td>
</tr>
<tr>
<td>Género</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Notas: *p < 0.10; **p < 0.05; ***p < 0.01; ****p < 0.001, bootstrapped. Elaboración propia
3.2 Prueba de las hipótesis del estudio

Varios modelos de regresión fueron implementados con los participantes del turno diurno (Tabla III). El LOG del supervisor estuvo asociado negativamente y significativamente con el ausentismo mientras que Otros Liderazgos tuvo efectos positivos, es decir, estuvo relacionado con aumentos del ausentismo. En cambio, en los turnos anormales, ni LOG ni los otros liderazgos presentaron efectos significativos (Tabla IV). En el turno diurno se observó una tendencia a mayor ausentismo con el número de hijos y un fuerte efecto del tiempo de trabajo con Org asociado negativamente al ausentismo. El número de hijos fue irrelevante en los turnos anormales, pero se replicó la influencia del tiempo trabajando en Org. La edad apareció como un factor importante en varios modelos de regresión en los turnos anormales, pero el efecto etario se explica por el tiempo trabajado en Org, que correlaciona con la edad.

La Tabla V presenta los coeficientes estandarizados de regresión del ausentismo sobre Otros liderazgos y Complejidad comportamental calculados bajo siete de los ocho modelos de regresión de las Tablas III y IV, revelando que Otros liderazgos carece de validez predictiva y la adición de Otros liderazgos a LOG le hace perder capacidad predictiva.

4. Discusión

El estudio confirma los hallazgos de la literatura sobre los efectos benéficos de LOG en call centers con el agregado de demostrar que estos efectos no se limitan a los hallazgos previos en las áreas del estrés y el desempeño laboral sino también ocurren respecto del ausentismo del personal; sin embargo, se observó el efecto benéfico de LOG solamente en la mitad de la muestra, correspondiente al turno diurno. Es decir, los resultados del estudio son consistentes con la hipótesis 1 solo hasta cierto punto, pues LOG no alcanzó efectos significativos sobre el ausentismo de los subordinados en los turnos anormales. Para explicar tal limitación, no se puede considerar que la población del turno de la mañana presente una mayor diferencia de género a favor de las mujeres que la de los turnos de la tarde y noche, así como un mayor número de hijos, pues las regresiones múltiples controlaron los efectos de estas variables. Para entender el fenómeno conviene partir del supuesto de que LOG hace más atractivo asistir cotidianamente a Org. Este atractivo debe ser comparado con el atractivo de no ir a trabajar, que podría ser mayor para la población diurna considerando que durante la mañana y tarde es posible realizar una serie de tareas domésticas y fuera de casa que suelen realizarse de día. El atractivo de no ir a trabajar podría ser más limitado para los empleados en los turnos anormales; por ejemplo, estos empleados, al quedarse en sus casas, en lugar de resolver problemas de los hijos, se

<table>
<thead>
<tr>
<th>Turnos y variables</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Turno diurno</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros liderazgos</td>
<td>-0.03</td>
<td>-0.04</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.06</td>
<td>-0.06</td>
</tr>
<tr>
<td>Complejidad comportamental</td>
<td>-0.06</td>
<td>-0.07</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.06</td>
<td>-0.09</td>
<td>-0.09</td>
</tr>
<tr>
<td><strong>Turnos anormales</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros liderazgos</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Complejidad comportamental</td>
<td>0.02</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
<td>-0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Elaboración propia
limitarian a verlos dormir. Una explicación alternativa podría centrarse en el esfuerzo que se necesita desplegar para asistir a Org, mayor en las horas punta de la mañana que en la tarde o noche. El atractivo de ir a trabajar a Org, aumentado por LOG, ayudaría más en la aplicación de esfuerzo en la mañana, pues es muy fácil acceder al centro de trabajo al mediodía o final de la tarde.

La hipótesis 2 no solo careció de respaldo empírico. Los liderazgos orientados al cambio, los resultados y los procesos, además de carecer de relación significativa con el ausentismo, disminuyeron la capacidad predictiva de LOG cuando fueron sumados a este. Peor aún, los componentes de estos tipos de liderazgo no correlacionados con LOG se asociaron con incrementos del ausentismo. El problema estadístico de la multicolinearidad existente entre LOG y Otros liderazgos puede explicar parte de los niveles de significación observados cuando ambos entraron en el mismo modelo de regresión, pero no el hecho de que los coeficientes estandarizados de regresión en sí mismos alcanzaran valores tan opuestos como −0.38 (p < 0.001) para LOG y 0.26 (p < 0.05) para Otros liderazgos.

La contradicción de la hipótesis 3 por los resultados del estudio, además de explicarse por las diferencias en atractivo de no ir a trabajar en uno u otro tipo de turno, podría atribuirse, al menos en parte, a autoselección de los empleados para trabajar en turnos diurnos o anormales. La naturaleza de la(s) variable(s) diferenciadora(s), sin embargo, no se hace evidente.

Las limitaciones del estudio son varias. La muestra que respondió al CVFMBI estuvo sesgada, pues quienes no lo respondieron presentaban mayor ausentismo; una muestra más representativa podría haber llevado a conclusiones más firmes. Los hallazgos no son generalizables más allá del área del ausentismo; todavía falta demostrar en Org si LOG también se asocia con las tardanzas y la rotación del personal y con variables que no están en su base mecanizada de datos, como la calidad del desempeño según Org y según sus clientes. Finalmente, no se indagó sobre las diferencias existentes entre el personal de los diversos turnos más allá de las variables estudiadas.

Los hallazgos del estudio tienen relevancia teórica para el tema del liderazgo efectivo. El que LOG, pero ninguno de los otros tipos de liderazgo del MVC, se hallara relacionado al ausentismo del personal refuerza los enfoques situacionales de la efectividad del liderazgo. Lo mismo hace el hecho de que LOG fuera efectivo en el turno de la mañana pero no en los de la tarde/noche. Durante demasiado tiempo ha prevalecido la idea de que hay una receta de liderazgo (transformacional, transaccional, LMX, complejidad comportamental) buena para toda situación; los hallazgos presentes sugieren la conveniencia de desarrollar teorías que predigan bajo qué situaciones específicas ciertos tipos de liderazgo conseguirán éxito. El MVC puede ser un modelo apropiado para el desarrollo de este tipo de teoría; el MCV recibió apoyo empírico en el presente estudio al encontrar que, en una cultura donde prevalecen valores de cooperación (Org), el tipo más exitoso de liderazgo fue LOG. La pregunta que sigue es si LOG será efectivo en call centers donde prevalece una cultura organizacional de control u otras culturas.

Los hallazgos tienen relevancia práctica para los call centers, incluido Org. Programas de capacitación de supervisores en manejo de grupos de trabajo con una orientación a la gente tienen una alta probabilidad de reducir los niveles de ausentismo. Los presentes hallazgos sugieren que los call centers deben estar advertidos de que un énfasis en otros tipos de liderazgo puede traer resultados contraproducentes. Una orientación del supervisor al cambio puede ser altamente disfuncional en ese contexto, y las orientaciones a los resultados y los procesos deberían administrarse con prudencia.
Referencias


**Corresponding author**

Federico R. León can be contacted at: federicorleone@gmail.com

For instructions on how to order reprints of this article, please visit our website: www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com
The financial services industry and society

The role of incentives/punishments, moral hazard, and conflicts of interests in the 2008 financial crisis

Noel Murray
Argyros School of Business and Economics, Chapman University, Orange, California, USA, and

Ajay K. Manrai and Lalita Ajay Manrai
Department of Business Administration, University of Delaware, Newark, Delaware, USA

Abstract

Purpose – This paper aims to present an analysis of the role of financial incentives, moral hazard and conflicts of interests leading up to the 2008 financial crisis.

Design/methodology/approach – The study’s analysis has identified common structural flaws throughout the securitization food chain. These structural flaws include inappropriate incentives, the absence of punishment, moral hazard and conflicts of interest. This research sees the full impact of these structural flaws when considering their co-occurrence throughout the financial system. The authors address systemic defects in the securitization food chain and examine the inter-relationships among homeowners, mortgage originators, investment banks and investors. The authors also address the role of exogenous factors, including the SEC, AIG, the credit rating agencies, Congress, business academia and the business media.

Findings – The study argues that the lack of criminal prosecutions of key financial executives has been a key factor in creating moral hazard. Eight years after the Great Recession ended in the USA, the financial services industry continues to suffer from a crisis of trust with society.

Practical implications – An overwhelming majority of Americans, 89 per cent, believe that the federal government does a poor job of regulating the financial services industry (Puzzanghera, 2014). A study argues that the current corporate lobbying framework undermines societal expectations of political equality and consent (Alzola, 2013). The authors believe the Singapore model may be a useful starting point to restructure regulatory agencies so that they are more responsive to societal concerns and less responsive to special interests. Finally, the widespread perception is that the financial services sector, in particular, is ethically challenged (Ferguson, 2012); perhaps there would be some benefit from the implementation of ethical climate monitoring in firms that have been subject to deferred prosecution agreements for serious ethical violations (Arnaud, 2010).

© Noel Murray, Ajay K. Manrai and Lalita Ajay Manrai. Published in Journal of Economic Finance and Administrative Science. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licenses/by/4.0/legalcode
Originality/value – The authors believe the paper makes a truly original contribution. They provide new insights via their analysis of the role of financial incentives, moral hazard and conflicts of interests leading up to the 2008 financial crisis.

Keywords Society, Financial crisis, Financial incentives, Financial services industry, Conflicts of interest, Moral hazard

Paper type Research paper

Introduction

It takes something more than intelligence to act intelligently (Fyodor Dostoyevsky, Crime and Punishment).

It is eight years since the Great Recession officially ended in the USA, in June 2009 (NBER, 2014). No other economic event, in recent memory, has provoked such profound self-examination in the USA of the ethical behavior of some of our most revered financial institutions. From a business and society perspective, the behavior of firms in the financial service sector has damaged confidence in society about the ethical integrity of the financial system (CBS/NYT, 2013). We are now in an excellent position, thanks to details emerging from hundreds of civil lawsuits, to reflect on the causes of economic collapse and to assess the lessons learned (Ferguson, 2012). Although the US economy has rebounded, the recovery has been slow and uneven (Lee, 2014). Median household income of US$74,100 in 2012 lags that of 2006, when it stood at US$93,800 (Bricker, 2012). Unemployment, at 6.3 per cent in 2014, has improved relative to the Great Recession height of 9.6 per cent, but lags pre-recession level of 4.6 per cent in 2007 (Labor UB, 2014). Young people are especially pessimistic about their future, with only 39 per cent believing they will be better off financially as compared to their parents. Comparable figures for Brazil and China stand at 84 and 81 per cent, respectively (Fry, 2013). Increasingly, young Americans are being asked to shoulder the financial burden of their college debt, with total student loan balances growing from US$260bn in 2004 to US$1.11tn, ten years later (Lee, 2013). The societal impacts of the Great Recession, thus continue eight years later.

The ethics literature has produced a considerable body of research which addresses the role of particular classes of “players” in the Great Recession. These include commercial banks (Soltani, 2014), financial professionals (Graafland and van de Ven, 2011), graduate business school education (Huhn, 2013), stockbrokers (Angel and McCabe, 2013), credit rating agencies (Scalet and Kelly, 2012), chief executive officers (Ferrell and Ferrell, 2010) and the business media (Chakravartty and Schiller, 2010). Very little research however, has focused on the relationships among key players and the co-occurrence of common structural flaws among various components of the global financial system. The focus on individual components of the financial system privileges micro-level analyses and ignores the complex relationships among government, markets and society that lead to system-wide failure. We address the call for more descriptive research to examine the interconnected roles of firms in society (Rowley and Berman, 2000).

This paper addresses the need to examine systemic defects in the system by focusing on the financial system as a whole, and the multifaceted relationships among key players in the system. Our study also addresses the need for consolidation in ethics research by applying common conceptual frames across industry, government, media and academic sectors (Wood, 2000). Much of the post-mortem analysis of the crisis in the popular press (Reckard and Hamilton, 2014) and even in academic journals (Boddy, 2011) offers up moral assessments of various parties to the crisis. Our focus, eschews such analysis, to concentrate
on more managerially relevant factors, such as the role of incentives/punishments, moral hazard and conflicts of interest among the key players in the securitization food chain.

We address the inter-relationships among components of the “securitization food chain”, i.e. homeowners, mortgage originators, investment banks and investors. We also address the role of exogenous parties, what we refer to as “key enablers”, i.e. the ratings agencies, AIG, Congress, regulatory agencies, academia and business media (Figure 1). We approach the financial crisis from a holistic perspective, analyzing the interrelationships among parties with the goal of developing a better understanding of systemic factors leading to the financial crisis. The research study may have several academic and practical contributions beyond the financial services sector to include any context involving problematic incentives and conflicts of interests. The analysis serves as a guide to regulators and to those in corporate governance in general, on how system wide failures and perverse incentives can lead to fraudulent behavior within organizations.

We organize the paper as follows: we begin by defining key terms in our analysis, such as conflicts of interests, incentives and moral hazard. Next, we describe the securitization food chain, including its key components, homeowners, mortgage originators, investment banks and investors. We also address the role of key exogenous “enablers” including the credit rating agencies, AIG, Congress, regulatory agencies, business academia and business media. Lastly, we offer up summary conclusions and recommendations.

**Theoretical framework: the role of incentives, moral hazard and conflicts of interest in the financial crisis**

In line with objectives in the introduction, we focus on managerially relevant variables that played a key role in the development of the financial crisis. These variables include direct and indirect incentives, conflicts of interest and moral hazard. We discuss these concepts in the context of relationships outlined in Figure 1.

**Conflicts of interest**

Conflicts of interest have been identified as key variable leading to unethical behavior in some industries, including medicine (Sah, 2013). We adopt McDonald’s definition of a conflict of interest. That is:

---

**Figure 1.**
Securitization food chain and key exogenous entities

---

Own elaboration
a situation in which a person has a private or personal interest sufficient to appear to influence the objective exercise of his or her official duties as, say, a public official, an employee, or a professional (McDonald et al., 2002, p. 68).

Charles Ferguson, in his Academy Award-winning documentary on the financial crisis, the Inside Job, cites several instances where conflicts of interest played a key role in the lead-up to the collapse of the financial system (The Inside Job, 2010). We will present evidence of conflicts of interest throughout the securitization food chain, depicted in Figure 1.

**Incentives/punishments**
The Board of Governors of the Federal Reserve System has identified risk-taking incentives, provided by incentive compensation arrangements in the financial services industry, as a key contributing factor to the financial crisis (Board of Governors of the Federal Reserve System, 2011). The widespread acceptance of the Anglo-Saxon shareholder model within the financial services industry, with its emphasis on the principal-agent problem of aligning incentive compensation with share price performance, was the moral and philosophical basis for such compensation practices (Quinn and Jones, 1995). The President Obama signed the Dodd-Frank Wall Street Reform and Consumer Protection Act into law on July 21, 2010. Among the Act’s many provisions are new rules for incentive compensation. A large body of research in behavioral economics supports the view that proper alignment of incentives with a decision-making environment can be a powerful way to induce certain behaviors (Kamenica, 2012). We address the role of incentives/punishments, not only in the financial services industry, but also for all players in the securitization food chain. We identify “revolving door” as a type of indirect incentive to “look the other way” when employees, in relatively low paying regulatory jobs, are biding their time before they transition to more remunerative positions in the private sector. We see these indirect incentives as a key component of the broader process of regulatory capture.

**Moral hazard**
Moral hazard refers to a situation in which an individual or an institution is more likely to take risks because the costs that could result will not be borne by the party taking the risks (Dembe and Boden, 2000). Frequently, moral hazard occurs when there is information asymmetry, a situation in which a party in a transaction has more information than another, and one party is insulated from the negative consequences of the risk (Krugman, 2009). In the context of the financial crisis, a moral hazard exists if a financial institution knows it is protected by a lender of last resort (government) and, as a result, engages in riskier investments because it believes losses will be borne by someone else (Stiglitz, 2010). One peculiar aspect of moral hazard during the financial crisis of 2008 was the absence of criminal prosecution of organizations or individuals for criminal behavior. Instead, the “punishment” was borne by way of financial penalties, payed out by organizations, at the cost of their shareholders (Ferguson, 2012).

**The securitization food chain**
The securitization food chain is an industrywide supply chain for generating mortgages from homeowners and selling them to investment banks. Investment banks, in turn, repackage them into “structured” investments for sale to a variety of investors, including pension funds, hedge funds and other institutional investors. This supply chain integrates nearly every segment of the financial system (Ferguson, 2012, p. 40). The invention of new financial products such as credit default swaps (CDS), collateralized debt obligations (CDO)
and “synthetic” mortgage securities, all contributed to a complex, opaque system, wherein few understood the true dimension of the systemic risk for society. At the heart of the securitization food chain are four players: home owners, mortgage originators, investment banks and investors. The securitization food chain could not have prospered, however, with the tacit support of key exogenous players including the insurance giant AIG, the credit ratings agencies (CRA), Congress, various regulatory agencies including the Securities Exchange Commission (SEC), the Federal Reserve and the Commodity Futures Trading Commission (CFTC). Two additional “enablers” of the supply chain have have received relatively little academic attention for their role in feeding the financial food chain – academic economists, business schools and business media, including business magazines and 24-h cable business channels (Chakravartty and Schiller, 2010). We now address the role of financial incentives, moral hazard and conflicts of interest among each of the majors players depicted in Figure 1.

**Homeowners**

Those on the ideological right argue that we should not neglect the role of individual responsibility and risky choices made by homeowner mortgage-holders as a contributory factor to the financial crisis (Milan and Sufi, 2014). A competing narrative, on the left, argues that predatory financial institutions preyed on unsophisticated borrowers with complex, variable rate, subprime mortgages (Ferguson, 2012). Noticeably, very little research has addressed consumer decision-making for home mortgages. What were the incentives for homeowners to engage in “risky” behaviour? And why did home mortgage purchasers engage in (on reflection) such poor decision-making? What was the role of marketing in consumer decision-making?

In the run up to the crisis, advertising campaigns, such as Citigroup’s “Live Richly” campaign, targeted middle-class America, urging:

[... ] potential consumers not to work too hard, to not consider money be all that important, to find meaning and fun from activities that emanate from their own creativity, individuality and relationships with loved ones [... ] (Marcus, 2005).

Campaigns such as the Citigroup campaign played their role in urging homeowners to borrow against the increasing equity in their homes. The campaign is illustrative of how marketing is implicated in the new spirit of excess of consumerism, where disenchantment with global consumer culture is repackaged in the promise of privitized life choices (Chakravartty and Schiller, 2010).

Like investment banks, consumers benefited from risky leverage of appreciating assets in an up market. The Case-Shiller US National Home Price Index doubled between 2000 and 2006, the largest and fastest increase ever recorded (Case-Shiller, 2012). Indeed, median household net worth soared in just two years from US$84,400 in 2004 to US$93,800 in 2006, largely driven by increased home equity (Lee, 2014). Then, there was the absence of punishment. Like the mortgage originators, homeowners who criminally falsified financial information for loan application documents, faced little risk of prosecution. So widespread was the problem that, as early as 2004, the FBI issued, and heavily promoted, a warning of “an epidemic of mortgage fraud” (Ferguson, 2012, p. 58). Eventually, all pretense of doing due diligence on the borrowers’ credit worthiness was abandoned with the emergence of “NINJA loans”, in which the borrower had no income, no job (and no) assets (NINJA). It is questionable whether many homeowners understood the details of some of the subprime mortgages they purchased. Robert Gnaizda, President of the Greenlining Institute in Berkeley, met with Fed Chairman, Alan Greenspan, once a year, and reported the following.
conversation: “We gave him an example of Countrywide, and 150 different complex adjustable-rate mortgages. He said, “If you had a doctorate in math, you wouldn’t be able to understand them enough to know which was good for you and which wasn’t” (Greenspan, 2010).

From 2000 onward, as home values rocketed and wages stagnated, homeowners used their home equity as collateral to borrow more. This debt-financed consumption had real, if short term, economic benefits, fueling consumption-driven economic growth. Research indicates that much of the borrowing against home equity appears to have been spent on consumer goods and ill-fated improvements to homes whose values would soon plummet. Little of the borrowed money appears to have been used to pay off credit cards or invest in securities, or businesses (Akst, 2014). Some mortgage holders were home flippers – speculating on buying multiple houses with no intent to occupy them, hoping, however, to flip them at a profit. The homo economicus perspective sees these consumers as materialistic, utility maximisers, hoping to extract maximum individual profit. In this Darwinian view of the world, homeowners who leveraged the most won. In sum, according to the homo economicus view, homeowners made an economic bet and lost.

How useful is this perspective? The account of irresponsible, profligate borrowers, feeds into centuries-old narratives, condemning borrowers on moral and religious grounds. Whatever its truth value, it has little analytical usefulness if one’s goal is to redesign an economic system to prevent such a recurrence. One cannot legislate morality. One can, however, address the role of incentives that fuel such behaviour.

Unlike the Great Depression of 1929, when home debt relief was a major, if belated, response to the crisis, there appears to be little evidence that mortgage holders expected to be bailed out en mass by the federal government. Indeed, the tendency in the media to demonize overextended homeowners probably contributed to the muted response by the federal government to bail out homeowner debtors in the same way that the financial services industry was bailed out (Milan and Sufi, 2014). The behavior of home owners, therefore, does not seem to fit the definition of moral hazard; they could not reasonably believe that any other party would shoulder the expense of bailing them out. The financial incentives to take out mortgages were strong; a decade of Chinese purchases of US securities and a low interest policy of the “Greenspan” Federal Reserve made mortgages cheap. Tax incentives on mortgage interest expense, and an absence of punishment for lying about income on loan applications – a federal offense – all conspired to incentivise the “gold rush” to acquire ever larger mortgages. These financial incentives were clothed in a national ideology promoting a home ownership culture. The ideology was perhaps best championed by President George Bush, who famously stated on October 15, 2002, “you don’t have to have a lousy home, the low income earner can have just as nice a home as anyone else” (The Inside Job, 2010). On the left, the Community Reinvestment Act of 1977, contributed to the creation of a subprime market, and was seen as a way to encourage home ownership among minorities and low income groups.

To fully understand the behavior of homeowners, one must look to the role another key player in the securitization food chain; the mortgage originating sector for high pressure, deceptive and often illegal, sales practices.

Mortgage originators
The mortgage origination business underwent a dramatic restructuring in the 1980s. For decades, banks made home loans according to the “originate and hold” model. The bank that originated the mortgage held the mortgage. Thus, banks had a powerful financial incentive to do due diligence on the borrower’s ability to pay back the loan over the duration of the
mortgage. The new model “originate and distribute”, quickly dubbed “securitisation”, pooled illiquid assets, like mortgages and transformed them into liquid assets that were tradable on the open market. These financial innovations were called mortgage backed securities (MBS). The new financial incentives for the mortgage originator were very different from the old “originate and hold” model. The primary economic incentive under the new “originate and distribute” model is to hold the mortgage for as little time as possible, before unloading it to the next player in the securitization food chain.

Each sale gives the mortgage originator more money with which to make more loans; it has little incentive to monitor the underlying risk of the mortgages it originates. In principle, the originate and distribute model works well so long as investors can accurately assess the risk inherent in the securities (Roubini and Minh, 2010). A transparent process facilitates risk assessment; an opaque, complex and fraudulent process frustrates due diligence.

Among the goals for regulation of any market are, first, to maintain market confidence, second, to secure an appropriate degree of protections for consumers and investors and, third, to reduce the extent to which a regulated entity can be used for a purpose connected with the crime. Remarkably, the mortgage origination business was largely unregulated. With the benefit of eight years of hindsight since the economic recovery officially began, we now have a large body of new information to shine a light on the inner workings of the mortgage origination business, thanks largely to information revealed in civil lawsuits among the parties for recovery of fraudulently obtained money.

Extensive evidence of unethical and sometimes, outright fraudulent behavior, in the mortgage origination sector, is revealed in recent civil lawsuits. Perverse incentives appeared to play a crucial role in many of these cases, including the following (Ferguson, 2012):

- Payments by lenders to mortgage brokers based on “yield spread premiums”. These incentives effectively functioned as inducements for pushing borrowers into the most expensive loans possible.
- Negative quality control. There was widespread evidence of covert strategies by senior executives at mortgage originators to emasculate in-house risk management and quality control functions. The muting of risk management appears to have been motivated by incentives that rewarded high-yield loans regardless of risks, and to cover up risks that were identified.
- The proliferation of deceptive loan structures and sales practices. More than 30 per cent of all homeowners receiving subprime loans during the lead-up to the financial crisis actually would have qualified for a prime loan.
- Widespread fraudulent deception committed against immigrants with poor English and weak financial skills who were misinformed about the contents of their loan documents. The incentives to prey on immigrants were strong as this group was unlikely to report malfeasance to the police. The FBI reported that “80 per cent of all reported fraud cases involve collaboration or collusion by industry insiders” (US Department of Justice Federal Bureau of Investigation, 2005, p. D1).
- CEOs of mortgage origination companies were aware of and incentivised the origination of loans they knew were likely to fail. At one company, the CEO made a presentation to their Board stating that their goal “was to achieve 82 per cent higher risk originations by 2008”, while internal reviews of one of their high-production centers revealed that 58 per cent of loans reviewed were found to have high levels of fraud. The managers of the unit involved were not disciplined, and investors were
not notified that the loans they had purchased from these centers contained fraudulent documentation.

- CEOs and senior executives presented false statements to investors, auditors and the public, both during the bubble and afterward, as their firms started to collapse.

While the above examples point to a case of systemic unethical practices and widespread fraudulent behavior in the mortgage origination sector, evidence also suggests that they were often abetted by auditing firms who “looked the other way”. The auditing firms showed “professional negligence” and investment banks continued to demand higher yielding loans from higher-risk originations. Investment banks were little concerned with the long-term performance of the collateralized debt obligations (CDOs) or evidenced much fiduciary concern for the welfare of their investor customers (Ferguson, 2012).

In the case of mortgage originators, there appears to be strong evidence that problematic incentives drove behavior that was frequently unethical, and often fraudulent. The lack of regulatory oversight, and the absence of civil or criminal litigation, all functioned to create a moral hazard at both an organizational and individual level. As there was no meaningful professional certification among mortgage originators, there was little opportunity for professional ethical indoctrination as is the case in other professional fields. At the organizational level, the risks associated with non-performing loans was not borne by the loan origination companies themselves under the “originate and distribute” model, but, instead, got passed along the securitization food chain – a classic case of moral hazard. At the individual level, those employees who offloaded risky, but profitable, subprime loans to “dupes” suffered no meaningful consequences when the home loans failed. Individual mortgage originators face little prospect of criminal prosecution or internal organization censure for criminal doctoring of loan documents.

More broadly, the above analysis of the mortgage origination industry points to the contested nature of corporate social responsibility (CSR) and the incompatibility of moral and governance frameworks within an industry not known for professional ethics training of its employees (Mitnick, 2000).

**Investment banks**

Critical reviews of the CSR literature have called for more descriptive research on how firms’ roles in society are shaped in the interactions between firms and their stakeholders (Griffin, 2000). We address these roles by examining a number of questions. Why did investment banks so aggressively incentivise unethical, and sometimes, fraudulent behavior for their partners, the mortgage origination companies? Why would they seek loans that would have a high probability of failing? Was this a simple case of information asymmetry, whereby only the mortgage origination companies truly knew the poor quality of their home loans? Answers to these questions are necessary before we can understand the role of CSR in the financial services sector.

The role of incentives at investment banks was more complex than the case at the mortgage origination companies. First, there was at least an implicit assumption that investment banks had a fiduciary duty to act in the best interest of their customers and counter parties. Second, some investment banks were so big, and so integrated into the global financial system, that their failure posed the threat of systemic global financial collapse. In other words, they were “too big to fail”.

Subprime home loans had higher interest yields and, therefore, could be packaged and sold more easily to institutional investors, so long as they continued to receive AAA, the highest quality investment grade from the CRA. Investment banks rarely held onto these
CDOs for longer than one or two months, before offloading them onto investors; consequently, their risk was limited to this brief holding period. Investment banks had an incentive to source subprime loans over prime, and to pass the economic incentives down the securitization food chain. Evidence from civil lawsuits shows that internal investigations at investment banks revealed the extent of the problem with the quality of loans sourced, and that many loans clearly violated their own internal risk standards. When given a choice to reject these mortgages, or ignore their internal standards, investment banks invariably chose the latter (Ferguson, 2012, p. 100).

Stockbrokers have a legal and ethical requirement to recommend only “suitable” investments to their customers, but contrary to popularly held beliefs before the crisis, most brokers do not have a stricter, legal fiduciary duty to their customers (Angel and McCabe, 2013). This was but one of the many examples of information asymmetry that existed between agents of investment banks and customers who bought CDOs. The information asymmetry created a moral hazard for the investment banks’ agents, as they were insulated from civil lawsuits based on alleged violations of fiduciary duty to investors. Brokerage firms often have numerous conflicts of interest with their customers in that products that pay the highest commissions may not be the best ones for their customers. Commissions create powerful incentives for the entire securitization food chain but at the same time produce conflicts of interest – a type of ethical pollution. It is doubtful that most customers are aware of the extent of these conflicts of interests, thus creating a classic asymmetry of information. Given that the CDO market is more complex and less transparent than the equity market, the information asymmetry works against efficient markets.

A second issue of incentives concerns the role of executive compensation. Many believe that excessive executive compensation and flawed incentive compensation practices can at least be partly blamed for the imprudent risk-taking that helped spark the economic crisis (Grant Thornton, 2014). The bonus culture mentality of the investment banks was born out of an attempt to address the age-old principal-agent problem. To align compensation of agents (executives) more directly with the interests of principals (shareholders), bonuses were used to reward executives for actions that maximised profitability. This is standard practice in corporate America. The incentive problem at investment banks, however, was the mis-aligned timing of incentives versus performance; cash bonuses were awarded based on short-term profits, but there were no penalties for long-term losses. Consider the basic bet: you make an extra US$10m a year by making high-risk, high-reward bets, but you put your financial institution at risk. If the institution fails, shareholders pay the bill. If your institution is too big to fail, tax payers pay the bill. The bet is fraught with moral hazard. The problem with bonus-heavy incentives was particularly acute at investment banks. This was because many employees below the level of top executive positions were engaged in activities sufficiently risky to expose their institution to material financial loss, e.g. traders with large position limits relative to the bank’s overall risk tolerance (Board of Governors of the Federal Reserve System, 2011). Similarly, groups of employees who are subject to similar incentive-based compensation arrangements may, in the aggregate, expose a financial institution to a material amount of credit risk (note this was widespread in the loan origination business).

The systemic risk posed by these incentive structures was described in 2005, by Raghuram Rajan, then the chief economist of the International Monetary Fund. He delivered a paper at the annual Jackson Hole Symposium, the most elite banking conference in the world. Rajan’s paper focused on incentive structures that generated huge cash bonuses based on short-term profits, but which imposed no penalties for later losses. Rajan argued
that these incentives encouraged bankers to take risks that might eventually destroy their firms, or even the entire financial system (2006). Raghuram later added:

It’s very easy to generate performance by taking on more risk. And so what you need to do is compensate for risk-adjusted performance. And that is where all the bodies are buried (2010).

There have been some proposals to address the incentive problem at investment banks. Among them include the need to (Board of Governors of the Federal Reserve System, 2011):

- make risk adjustments to the amount of incentive compensation award for an employee to take into account the risk the employees’ activities may pose to the organization;
- defer a portion of the incentive compensation awards;
- identify key employees for whom incentive compensation arrangements may pose a threat to the organization’s safety; and
- involve risk-management and control personnel when designing incentive compensation arrangements.

Perhaps a more radical approach to executive compensation is warranted in light of increasing evidence that the favored tools of regulators and shareholders – deferral and often complex long-term incentive structures – may not produce the hoped-for results (PWC, 2012). A PWC survey of global senior executives in the financial services sectors shows that only a limited number of executives are motivated by highly leveraged and volatile pay packages. The same survey found that participants believed that pay is as much about fairness and recognition as it is about incentives. The exclusive focus on share price incentive models of executive compensation may potentially blind us to viable alternatives to organizing the relationship between the investment banking industry and society (Matten and Moon, 2008).

In sum, when one evaluates behavior in the investment bank sector, problematic incentives, moral hazard and conflicts of interests (exacerbated by information asymmetries) appear to play a large role in executive decision-making. The actions undertaken by investment banks in constructing risky CDOs, on a base of shaky subprime mortgages, however, would not have worked were it not for the cloak of legitimacy provided by the CRAs. Without the AAA seal of approval from the CRAs, the banks could not have sold these CDOs to institutional investors. Next, we examine the role of incentives, conflicts of interest and moral hazard at the exogenous entities, beginning with, CRAs.

Exogenous entities
Credit rating agencies
The CRA industry operates as a specialized information market whose product serves as a public good. CRAs evaluate securities issued by firms and governments to determine the likelihood that the issuer will repay the debt. CRAs use their proprietary models to provide a single rating, such as AAA or Aaa, to represent the creditworthiness of firms. Many investors relied on these ratings, and for institutional investors, the expert opinion functioned as authorized seals of approval (Steven and Kelley, 2012). Additionally, CRAs advise issuers of CDOs how to package their debt instruments to receive a favorable rating. Investment banks, in turn, rely on these ratings to attract investment buyers (Rom, 2009). Few would argue that the CRA performed their function adequately in the lead-up to the financial crisis. In the span of a couple of months, in 2008, previously AAA-rated bonds fell
into junk status to the tune of US$14tn. Days before AIG was bailed out by the government, it had received AA ratings from the CRA.

The CRA industry is regulated by the Securities and Exchange Commission (SEC) whose responsibility, for the CRAs, is to ensure the quality of ratings and prevent conflicts of interests. By its criteria, the SEC failed in its supervisory role over the CRAs. The CRAs illustrate the presence of conflicts of interest, problematic incentives and moral hazard.

The issuer-pay compensation model creates a prima facie case of conflict of interest. The problem is confounded when CRAs offer consulting services to bond issuers on how to design CDOs to get specific ratings. The conflict of interest arises if the CRA privileges the satisfying of client interest over the provision of accurate ratings. The consulting conflict of interest arises when the CRA receives significant fees for consulting services on how to package securities that they will later rate. The conflicts of interests between lucrative revenues versus accurate rating creates an environment where “tying” and “notching” are likely to occur. Both of these activities are explicitly proscribed by the SEC, but there appears to have been little attempt at enforcement (Coskun, 2008). Before the unravelling of the crisis, many investors believed that the CRAs had a legal obligation to provide accurate ratings. As the crisis unfurled, many were dismayed to find that the CRAs “analysis” was insulated from lawsuits via first Amendment, free speech protection; the “analysis” represented nothing more substantial than their “opinions”. The “free speech” protection for the CRA effectively functioned as a moral hazard, ensuring that the CRAs would bear no legal – and in turn, no financial – consequences for their inflated ratings. The impact of the moral hazard was all the greater for the extent of the information asymmetry that existed between corporate lawyers of CRA and the outside investors. The conflicts of interest built in to the issuer-pay model ensured that the financial incentives for the CRAs rewarded behavior that tailored pleasing ratings to their customers at the expense of accurate information for the investor. Another aspect of conflict of interest is the concept of the “revolving door”. The movement of individuals from the CRA to investment banks, often at multiples of salaries, sometimes to institutions whose CDOs they had previously rated, creates an additional conflict of interest and indirect incentive to “look the other way” when tasked with rating future employers’ securities. Staff at CRA know that their future career prospects are often at stake when they evaluate securities from customers. Because CRA produce a public good, the combination of conflicts of interest and distorted incentives served to create a “captured agency”. A captured agency occurs when a regulatory agency, created to act in the public interest, instead advances the commercial concerns of a particular group (Lee, 2006). As such, it represents a case of government failure because it creates an opening for firms to behave in ways injurious to society (e.g. producing negative externalities). Strier recommends that the federal government prohibit the issuer-pay model, ban CRA from rating issues from the same client for more than five years, and from consulting on the design of any issue it rates (Strier, 2008). The SEC, with input from the CRA industry, is currently evaluating the best response to regulating the CRAs.

**Securities and exchange commission**

The SEC, along with the Federal Reserve (Fed) and the Commodity Futures Trading Commission (CFTC), is one of a number of regulatory institutions whose statutory role includes the assurance of the efficient functioning of the financial services market and the protection of investors. The SEC, in particular, has come in for substantial criticism for its
failure to live up to its statutory mandate in the lead up to, and the subsequent unfolding of the financial crisis. Among the criticisms levelled at the SEC, include conflicts of interest, revolving door policy, insufficient financial incentives to hire and maintain highly qualified staff; all attributes that point toward regulatory capture. Harry Markopolos, a financial analyst who spent more than a decade giving repeated warnings of fraud to the SEC regarding Bernie Madoff, has called the agency “nonfunctional captive to the industry” (Pressman, 2009). Significant conflicts of interest arise over the SEC’s revolving door between staffers and the firms they regulate. The list of officials who have left the SEC for lucrative jobs in the private sector and who have sometimes returned to positions in the SEC, is long. This latter trend, referred to as “opposite revolving door”, is particularly troublesome because it heightens the concern that the conflict of interest could bias SEC oversight and undermine public confidence. A second manifestation of the revolving door has been the political appointments of former industry executives into positions of significant influence over regulations that relate to their former firms (POGO, 2011). Some of these concerns could be addressed by strengthening post-employment restrictions.

One way to ensure a regulatory agency does not, or is incapable, of fulfilling its mandate, is to starve it of sufficient resources to do its job. The SEC has been described as underpaid and understaffed (Ferguson, 2012). The provision of sufficient resources to the SEC to enable it to fulfill its statutory mandate is the responsibility of Congress. One model that could address some of concerns noted above is the so-called Singapore model, whereby senior regulatory officers are paid market wage rates comparable to remuneration in the financial services industry. Lee Hsien Loong, Prime Minister of Singapore, has argued that incentives are needed to ensure that public service is not so great a sacrifice that capable people do not care to serve in it (Loong, 2012).Nouriel Roubini, economics professor at NYU, put it more directly, “people charged with overseeing the stability of the global financial system should reasonably be paid more than a receptionists at Goldman Sachs” (Roubini and Minh, 2010, p. 220). Singapore was not subject to excessive financial leverage of its institutions, being more tightly regulated, and thus largely survived the financial portion of the crisis unscathed (it did not escape other collateral effects of the crisis such as the drop in world demand for its exports).

The harshest criticism admonishes the SEC for its failure to prosecute allegations of widespread criminal behavior in the financial services industry (Ferguson, 2012). The lack of meaningful individual penalties for criminal wrongdoing has led to a cascading series of allegations that financial services firms are “too big to fail” or “too big to prosecute” or “too big to jail” or “too big to bar” (Lynch, 2014). During the Savings and Loan (S&L) crisis of the 1980s, a crisis that “only” cost the taxpayer US$124bn, thousands of S&L executives were prosecuted and hundreds went to jail. As of mid-2014, no senior executive, directly involved with the crisis, has been criminally prosecuted. The statute of limitations runs out for many by the end of 2014. The allegations of criminal wrongdoing in the financial services industry include securities fraud, accounting fraud, honest services violations, bribery, perjury, making false statements to federal investigators and Sarbanes-Oxley violations (certifying false accounting statements) (Ferguson, 2012, pp. 190-207). Failure to prosecute criminal behavior leads to moral hazard. Often firms have been willing to pay large sums to lock up deferred prosecution agreements, at shareholder expense, to avoid “uncertainty” and personal embarrassment (Bloomberg Businessweek, 2014). In Stiglitz’s view, investment banks view fines as a cost that is outweighed by the potential profit generated by the actions being sanctioned (Stiglitz, 2010). Absent individual prosecutions for criminal behavior, agents face a moral hazard, with the cost borne by
principals (shareholders) and society. Unless there is specter of jail time and a personal reputation hit, there is little reason to fear retribution from the law. Prosecutors with limited resources, no matter how dedicated to duty, find it difficult to avoid being seduced by negotiated settlements and the fiction of victory. Unless prosecutors face sanctions for failure to get individual criminal convictions where criminal fraud has occurred, they too, face a moral hazard.

AIG

Perhaps no single private institution played a more critical role in the financial collapse than AIG. AIG is a multinational insurance company, which specialized in selling insurance on events – such as the bankruptcy of an investment bank – that were unlikely to occur in any given year. In the short run, betting huge amounts of money insuring against catastrophes yielded large revenues and bonuses at AIG. AIGFP, a London subsidiary of AIG, insured over $500 billion dollars of CDOs against default with CDS. Because credit default swaps were unregulated, AIG did not have to put aside any money to cover potential losses, and chose not to purchase reinsurance to hedge against that risk. For investors who owned CDOs, credit default swaps worked like an insurance policy. An investor who purchased a credit default swap paid AIG a quarterly premium. If the CDO went bad, AIG promised to pay the investor for their losses. Unlike regular insurance, speculators could also buy credit default swaps from AIG to bet against CDOs they did not own. AIG used collateral on deposit to buy MBS. When the value of these MBS began to plummet as the crisis in the mortgage market unraveled, AIG had to pay out insurance claims and had to replace losses in its collateral accounts (Greenberg and Cunningham, 2013). The resulting liquidity crisis, and imminent bankruptcy, forced the Fed to step in to provide US$85bn in liquidity so that AIG could honor its credit default swap trading partners. In the end, the inevitable happened, and when AIG failed, the consequences for these excessive risks were borne by someone else – the US taxpayer.

The AIG case represents a clear case of moral hazard and the challenge represented by what economists call the principal-agent problem (Roubini and Minh, 2010). For large-scale institutions such as AIG, the principals (shareholders and board of directors) must employ agents (managers) to serve their best interests. Agents invariably know more about what is happening at the company (asymmetric information) than principals who may pursue their own self-interest to destructive effect. The challenge is how to structure incentives so that agents do not use the firm’s resources to place outsize, risky bets, to maximize their bonus and risk destruction of the firm. In the case of AIG, it was the actions of a relatively small number of individuals, based in London, which brought the ruin of a company, and a global financial system to the brink of collapse. The principals at AIG were not ignorant of the risk posed by the London office of AIGFP. In 2007, AIG’s auditors raised warnings. One of them, Josep St. Denis, resigned in protest after Joseph Cassano, head of AIGFP, repeatedly blocked him from investigating AIGFP’s accounting. As was the case in the mortgage origination sector, AIG and investment banks frequently looked the other way when risk management or internal auditors questioned risk exposure.

One might expect that shareholders would be highly motivated to prevent such destructive behavior since they are ultimately the owners. However, as Roubini and others have pointed out, shareholders of financial firms often do not have so much skin in the game, as these firms rely so heavily on borrowed money to finance their operations than do firms in the non-financial sector. Absent engaged shareholders, one is left with unsecured creditors of banks and other financial institutions to impose market discipline. However, the
belief in the lender of last resort support from the Fed undermined the motivation to act. In one of the more glaring conflicts of interests during the crisis, Treasury Secretary and former Goldman Sachs CEO, Henry Paulson, played a key role in ensuring that over US $60bn of taxpayer bailout money went to pay holders of CDSs in full, with US$14bn going to Goldman Sachs.

Investors
Investors were global – foreign investors bought more than half of CDOs and mortgage-backed securities (MBS) – among their ranks included pension funds, hedge funds, foreign banks and other institutional investors. Yet, relatively little is written about the role of those who bought the CDOs and the MBS that fueled the crisis. Nonetheless, incentive compensation among employees who worked at hedge funds was also geared toward leveraging risk. For hedge funds, compensation at the firm level was the so-called 2 and 20: customers were charged fees of 2 per cent of assets managed, while the fund kept 20 per cent of all gains. However, the fund did not participate in losses, creating an appetite for risk and moral hazard. A similar type of compensation structure operated at pension funds and mutual funds, in that incentives were structured to achieve optimal yield, with little attention paid to long-term performance. In time, pension funds and mutual funds came to trust the ratings of the CRAs uncritically, instead of doing their own independent research. Unlike some of the unsophisticated homeowners who took out ill-suited subprime loans, most of the investors were sophisticated institutional buyers and sometimes, even hedge fund arms of investment banks. They had access to market analysts and an unending stream of proprietary research. Therefore, a plausible argument can be made that caveat emptor should apply. The same access to proprietary research was not available to the public. What investors did not know, and could not know – as CDS were unregulated – was that, as early as 2006, Goldman Sachs (and later, other investment banks) started actively betting against CDOs it had sold to customers. By purchasing credit default swaps from AIG, Goldman could bet against CDOs it did not own, and then be paid when the CDOs failed (Ferguson, 2012, pp. 127-132). Neither academic economists nor the 24-h business media seemed any better informed about these ominous developments.

Academia
Some economists, such as Jon Hanson, argue that the phenomenon of regulatory capture extends beyond just regulatory agencies. Business has an incentive to control anything that can exert control over them, including the business media and academia. This phenomenon is called “deep capture” (Hanson and Yosifon, 2003). Academia has long been viewed as a relatively independent source of critical analysis of the financial system. In Inside Job, Charles Ferguson paints an alternative picture of academics as cheerleaders and apologists for the financial services sector. Among Ferguson’s assertions is that the financial services sector creates conflicts of interest in academia. This is achieved through the funding of think tanks at academic institutions, opinion pieces at leading newspapers and appearances on 24-h business cable channels; speaker bureaus used to disguise payments to academic economists for lobbying and policy advocacy; and lucrative board membership on investment banks (Ferguson, 2012, pp. 240-274). In particular, Ferguson asserts that two-thirds of leading economists in the fields of industrial organization and antitrust analysis have been adversely affected by academic conflicts of interests. Furthermore, he asserts, because the scope of these conflicts of interest entails so many economists, the SEC is often stymied in its attempts
to hire expert witnesses from academia. Driven partly by the criticism of academic economists’ muted response to the financial crisis, in 2012, the American Economic Association belatedly adopted a code of ethics requiring the disclosure of conflicts of interest in its seven top academic journals.

Since the 1980s, academic economists have been major advocates of deregulation, and played influential roles in shaping the US Government policy. In the lead up to the financial crisis, the academic economists framed the discussion of how free markets should operate, championed the economic contributions of the financial services sector and offered an intellectual bulwark against new financial regulations. Very few of these economic experts warned about the crisis, and even after the crisis, many opposed regulatory reform. It is unquestionably true that modern financial innovations are critical to the smooth working of a global economy. Yet, by early 2000, financial services firms were accounting for over 40 per cent of all corporate profits – far out of proportion to their contribution to national Gross Domestic Product (GDP). Former Chairman of the UK Financial Services Authority, Lord Turner, asked if modern finance had become a rent-extracting industry, that is, earnings derived largely from leveraging one’s position as a bottleneck, rather than from real economic contributions (Marr, 2009). In business schools across the country, from the mid-1990s onward, neo Keynesianism, and its more accommodating stance toward regulation of markets, was on the defensive. In its place, was the widespread celebration of the victory of unregulated markets, the championing of new financial innovations, such as the securitization of subprime mortgages and growth of over the counter derivatives. The naturalization of the market, and the privileging of shareholder interests over stakeholder interests, became increasingly dominant in elite business schools (Huhn, 2013). McMurtry has described this cultural transformation as the growth of the life-blind structure of economic rationality (McMurtry, 2012).

Business media
The complicity of the business media in creating the financial crisis was perhaps best captured by the comedian Jon Stewart, whose interview with Jim Cramer from CNBC’s Mad Money, became an online sensation after its airing in 2009 (Stewart, 2009). In essence, the interview revealed the enormous gap between what cable news advertises itself to its viewership – a vigorous watchdog of all things financial – versus the reality of its cheerleading of the performance of investment banks both before and during the early stages of the crisis. A study has asserted that economic journalism has been no mere reflection, but a constitutive element of the crisis (Chakravartty and Schiller, 2010). Economic pressures for ratings and advertising revenue distort coverage in favor of infotainment over in-depth scrutiny of social actors and the political-economic processes that helped propel the crisis. The current economic model that drives news media substitutes features and editorial over the expensive process of investigative newsgathering. The conflicts of interest arise when the cheerleading activities of such shows such as Mad Money drive ratings, advertising revenue and “softball” interviews. Indeed, the show’s daily stock recommendations seemed like a metaphor for a recurring theme of short-term performance incentives, with little accountability for long-term performance. The sensationalism of the daily stock recommendations grabs ratings and advertising revenue while the value of the securities recommended tended to fall after just two days (Karniouchina et al., 2009). Like the investment banks, the business news media feel the same pressure to “dance until the music stops”. Miller has argued that the hyper-speculative news frame serves to depoliticize an underlying ideology of radical market fundamentalism.
(2009). Lost in the clutter of the 24-h business news cycle was any meaningful discussion of urgent policy choices. The vacuum, instead, was filled with endless coverage aimed at the consumer of financial services, privileging minute-to-minute coverage of the gyrations of the stock market. If business media and academia do an inadequate job of policing the financial services sector, then the ultimate power and responsibility to do this rests with the US Congress.

Congress

The relationship between the financial services sector and Congress is analogous to its relationship to academia and the business media, i.e. it seeks to control that which would restrict the scope of its freedom to act. Vested interests in the financial services industry have a stake in regulatory activity as the scope of its operations is subject to a wide array of regulatory institutions. As we have seen in our discussion of academia, when regulators form expert commissions to examine policy, they seek input from academic and industry experts. The academic literature focuses on how smaller government units are easier for concentrated industries to capture. One study presents the opposite scenario, where large, powerful industries, such as financial services, can capture national government and use that power to block policies at the state level that voters may want (Moore and Giovinazzo, 2012). The most dramatic example of regulatory capture of a national government by the financial services sector was Iceland. At the time of its financial collapse, in late 2008, it had a population of 320,000, a GDP of US$13bn and bank losses of US$100bn (Ferguson, 2012, p. 253). In the decade leading up to the US financial crisis, the financial services industry spent US$5bn in lobbying and campaign contributions, while employing more than 3,000 lobbyists – five for each member of Congress. The conflicts of interests in this scenario seem self-evident. Are politicians responsive to the electorate, or to a powerful financial oligarchy? Dominique Strauss-Kahn, former head of the International Monetary Fund, has speculated whether the strength of the global financial services industry is a threat to political democracy (2010). Industry has every legal right to lobby Congress for first amendment rights, so the issue is not one of rights, but rather of the economic effects of such rights on society.

The financial services sector has had legislative success in the decades leading up to the crisis, including its signature victory, the repeal of Glass-Steagall, the Depression era legislation that created a firewall between commercial banks (which took deposits and made loans) and investment banks (which underwrote, bought and sold securities). Congress repealed the last vestiges of Glass-Steagall with the Financial Services Modernization Act in 1999. The latter Act effectively declared most derivatives off limits to regulation, and setting the stage for the explosive growth of CDS that ultimately undermined AIG. The FSM Act was debated in neither the Senate nor the House. The symbiotic relationship between the government and the financial services sector thus produced a dramatic change in the governance system as it related to the finance industry. Investment banks reacted to this deregulation by massively increasing its leverage to as much as 33/1 (meaning that a 3 per cent decline in assets would effectively make it insolvent). The ideological champion of a radical deregulated approach to free markets was Fed Chairman, Alan Greenspan. Greenspan had little interest in the widely held central banking philosophy that powerful institutions should attempt to inoculate the economy against the growth of financial bubbles. This was evident in his response to the 1987 stock market crash, when he was willing to use all the powers of the Fed to rescue it. This philosophy created a Greenspan “put” – i.e. the market guessed correctly that the Fed would ride to the rescue after a bubble collapsed. It created a moral hazard on a grand scale.
Neither did the financial service industry have to worry too much about substantial penalties for what many believe to have been widespread criminal behavior in the industry (Ferguson, 2012). The Obama administration has excused its failure to prosecute for bubble-related crimes, by arguing that while much of the behavior in the financial services sector was unethical, it was not illegal “part of my frustration, was that a lot of practices that should not have been allowed weren’t necessarily against the law” (Obama, 2011). The lack of criminal prosecutions, in stark contrast to what happened in the aftermath of the S&L crisis in the 1980s, served to strengthen the effects of moral hazard. As of July 2014, two investment banks have pleaded guilty to criminal charges, Credit Suisse and BNP Paribas, the first to collusion to defraud the US Government of taxes, and the latter to money laundering for nations deemed security threats to the USA. Neither bank pleaded guilty to any charges directly related to its role in the financial crisis. The BNP plea is an example of the principal–agent problem in that burden of the US$9bn in fines for the criminal actions of individuals – the agents of the firm – will be borne by the principals (shareholders). This lead FBI Director, James Comey to say, “Until shareholders hold corporate chiefs accountable for following the law, the money will keep walking out the door” (Reckard and Puzzanghera, 2014).

However, the agents who steer large financial firms appear willing to settle for non-prosecution agreements with large penalties, at shareholder expense, to avoid the embarrassment and the personal peril of extended trials. Prosecutors, with increasingly limited resources, due to Congressional “fiscal rectitude”, are often seduced by easily negotiated, non-prosecution settlements. Conversely, what is to protect companies from Department of Justice (DOJ) or SEC from shakedowns? (Bloomberg Businessweek, 2014). Congress can make it more difficult for prosecutors to take the easy way out by ordering them not to take action against companies unless individuals are being charged as well. Unless individuals are held accountable, for individual criminal behavior, moral hazard will continue to be a powerful force in the financial services industry.

**Conclusion**

Our analysis has identified common structural flaws throughout the securitization food chain. These structural flaws include inappropriate incentives, the absence of punishment, moral hazard and conflicts of interest. We see the full impact of these structural flaws when we look at their co-occurrence throughout the financial system. The structural flaws extend to government, regulatory agencies, business academics and the business media. Our study moves beyond moral analysis and normative ethical concerns, with the assumption that very few parties to the crisis are without moral culpability, and instead, we focus on systemic issues that are addressable via policy changes. We hope the study will serve as a guide to regulators, and to those in corporate governance in general, on how system-wide failures and perverse incentives can lead to fraudulent behavior in organizations and detrimental effects on society.

We believe that for free markets to work as intended, it is critical to maintain market confidence, that is, a widespread belief that the same rules of the game apply to all players, and that none are above the law. The lack of any criminal prosecutions related to this crisis has damaged such confidence. In a CBS News/New York Times poll in 2012, only 9 per cent of those polled expressed “A lot of confidence in banks and financial institutions”, while 49 per cent believed that “Corruption in banks and financial institutions is widespread” (CBS/NYT, 2012). The financial crisis has shaken society’s confidence in the integrity of the financial system. In a national survey by Better Markets, nearly two-thirds of Americans think the stock market is rigged against them and a majority believes that Wall Street and
financial institutions hurt average Americans (Puzzanghera, 2014). One might expect that with such concerns about the financial sector, the public would be strongly in favor of new regulations to impose market discipline, but the public seems deeply divided on this issue. When asked if they thought federal government regulates business too much/too little/right amount these days, 49 per cent agreed with “too much” versus 22 per cent with “too little” and 19 per cent with “right amount” (CBS/NYT, 2012). It would seem that the public has little confidence in government, as they perceive members of Congress to be captive to special interest groups. A 2013 CBS/NYT poll asked people “Do you think most members of Congress are more interested in serving the people they represent, or more interested in serving special interest groups?” Eighty-five per cent responded “special interests” versus nine per cent “people” (CBS/NYT, 2013). The public’s cynicism with the financial services sector is surpassed only with its cynicism of Congress, and points to a collective pessimism that any meaningful reform is possible.

In times of crisis, we might look to media journalism and academia to clarify essential truths. What are the true causes of the crisis? What are its social costs? What new political and economic reforms do we need to have in place to ensure no future re-run of this crisis? How do we ensure that principles of democratic accountability apply to those culpable of subverting existing laws? We have identified business media and business academia as key enablers of the crisis, yet each is subject to similar structural flaws and compromises as other players in the securitization food chain. Therefore, before either can assume positions of intellectual leadership, they too will require reputational makeovers.

We identified risk-taking incentives, provided by incentive compensation arrangements in the financial services industry, as a key contributing factor to the financial crisis. It is now generally understood that compensation practices, which feature a short-term bonus culture with no clawbacks for long-term performance are problematic. What was less understood is how employees, several layers below top level executives, were engaged in speculative activities sufficiently risky to expose their institutions to peril. Given the questions that have been raised by PwC consulting group and others regarding the efficacy of complex, contingency-based bonus structures, perhaps it is time for behavioral economics to readdress the principal-agent problem as it relates to bonus structures. At mortgage origination companies, we see how groups of employees, in relatively modest positions, but subject to similar incentive-based compensation arrangements, can, in the aggregate, expose their institutions to failure. Such incentives, in the absence of any professional qualifications and ethics training, can lead to being ethically questionable, and often, fraudulent behavior. Incentive compensation played a lesser role in the decision-making behavior of investors. Nonetheless, pension funds and other institutional investors, incentivised with short-term volume goals, may have had their due diligence clouded to the long-term economic performance of the securities they purchased on behalf of their clients.

It is perhaps surprising, that in a digital age of proliferation of information, that information assymetries played such a role in the many conflicts of interest among the parties implicated in the securitization food chain. For financially unsophisticated homeowners, the lack of any meaningful disclosure requirements on loan origination documents left them easy prey for unscrupulous mortgage originators. New disclosure requirements of the Dodd–Frank Wall Street and Consumer Protection Act aim to address this issue. It is now generally understood that investment banks have neither a morally accepted, nor legally imposed, fiduciary duty to their customers. Presumably, caveat emptor, will be the dominant creed among investors for the foreseeable future. However, one pernicious aspect of conflicts of interest remain – the revolving door between regulators, government and industry. Unless Congress allocates sufficient resources to regulatory
authorities such as the SEC, to hire and retain the highest quality personnel and then to hold them accountable via strict post-employment restrictions, society will continue to lack confidence in the ability of these institutions to fulfill their statutory mandate. Given the public’s current deep suspicion of Congress, it seems unlikely that such reforms are politically feasible.

As lender of last resort, the government is in a unique position to create moral hazard for all the players in the securitization foodchain. The US$700bn bailout of financial institutions was controversial on both sides of the ideological aisle: on the right, because it meant a de facto admission of market failure, and on the left, because the bailout privileged the needs of Wall Street over Main Street. The more subtle, but no less pernicious form of moral hazard, was the abject failure to hold responsible parties liable for criminal behavior. That thousands were prosecuted, and hundreds were jailed, for criminal behavior related to the 1980s savings and loan crisis, makes it implausible that similar behavior did not occur during the crisis that lead up to the Great Recession. The criminal misdeeds of the financial sector have been extensively documented (Ferguson, 2012). The morphing of “too big to fail” into “too big to prosecute” may well be the most important legacy of the Great Recession. Absent individual prosecutions for criminal behavior, agents face a moral hazard, with the cost borne by principals (shareholders) and society.

We see a number of productive opportunities for research on the relationship between the financial services sector and society. First, we see the need for additional empirical and descriptive research into why stakeholder theory (Mitchell et al., 1997) and CSR concepts seem to have gained so little traction in guiding the actions of executives in the investment banking and mortgage origination business. Even when the financial services sector does commit to a broader agenda of CSR, evidence indicates that such commitment is ambiguous and piecemeal (Furrer et al., 2012). Is ethical training in our graduate and undergraduate business schools providing the necessary support for stakeholder theory? Empirical research provides support for the notion that well designed business school ethics courses cause students to be less supportive of “stockholder-only” view of business (Simmons et al., 2009). Or is ethics education “captured” by those who teach the primacy of stockholder perspectives in finance? Second, research needs to address how CSR in the financial services sector is shaped in the interactions between incentive structures and the behavior of senior executives within the firm toward external stakeholders, such as customers and society (Frooman and Murrel, 2005; Mazutis, 2013). Third, research in the financial services sector needs to address the apparent incongruity between the formal descriptions of governance structures within financial services companies, as reported in internal written documents, such as corporate profile and statements of corporate values and identity, and actual policies and behaviors, as reported in the details of documents emerging from subsequent civil lawsuits (De Graaf and Stoelhorst, 2009). Fourth, we need a better understanding of how formal mechanisms of governance structures in the financial services sector, such as risk management, are undermined by informal structures, such as emergent organizational culture. Fifth, our study of the financial services industry points to the need for additional research into the relationship between business and society and the threat of regulatory capture and revolving door indirect incentives. In particular, additional research is necessary to integrate the role of financial services lobbying within the broader context of financial services CSR (Anastasiadis, 2013). An overwhelming majority of Americans, 89 per cent, believe that the federal government does a poor job of regulating the financial services industry (Puzzanghera, 2014). Another study argues that the current corporate lobbying framework undermines societal expectations of political equality and consent (Alzola, 2013). We
believe the Singapore model may be a useful starting point in restructuring regulatory agencies so that they are more responsive to societal concerns and less responsive to special interests. Finally, there is widespread perception that the financial services sector, in particular, is ethically challenged (Ferguson, 2012). Perhaps there would be some benefit from implementation of ethical climate monitoring in firms that have been subject to deferred prosecution agreements for serious ethical violations (Arnaud, 2010).

References
Fry, R. (2013), Young Adults after the Recession: Fewer Homes, Fewer Cars, Less Debt, Pew Research Center, Washington, DC.


Grant Thornton (2014), Beyond Banks: New Incentive Compensation Rules Reach Entire Industry, Grant Thornton LLP.


Hanson, J. and Yosifon, D. (2003), The Situation: An Introduction to the Situational Character, Critical Realism, Power Economics, and Deep Capture, University of Pennsylvania Law Review.


Lee, D. (2014), The Great Recession: Five Years Later, Where Are We Now?


Puzzanghera, J. (2014), “Poll finds 64 per cent of voters believe stock market is rigged against them”, *Los Angeles Times*, 17 July.


About the authors

Noel Murray is the Director of the Schmid Center for International Business and an Associate Professor at the Argyros School of Business and Economics, Chapman University, Orange, CA, USA. Noel Murray is the corresponding author and can be contacted at: nmurray@chapman.edu

Ajay K. Manrai is Professor of Marketing at the Department of Business Administration, University of Delaware, Newark, DE, USA.

Lalita Ajay Manrai is Professor of Marketing at the Department of Business Administration, University of Delaware, Newark, DE, USA.
The role of liquidity in asset pricing: the special case of the Portuguese Stock Market

María del Mar Miralles-Quirós and José Luis Miralles-Quirós
Faculty of Economics and Business Sciences, Universidad de Extremadura, Badajoz, Spain, and
Celia Oliveira
School of Technology and Management, Polytechnic Institute of Leiria, Leiria, Portugal

Abstract

Purpose – The aim of this paper is to examine the role of liquidity in asset pricing in a tiny market, such as the Portuguese. The unique setting of the Lisbon Stock Exchange with regards to changes in classification from an emerging to a developed stock market, allows an original answer to whether changes in the development of the market affect the role of liquidity in asset pricing.

Design/methodology/approach – The authors propose and compare two alternative implications of liquidity in asset pricing: as a desirable characteristic of stocks and as a source of systematic risk. In contrast to prior research for major stock markets, they use the proportion of zero returns which is an appropriated measure of liquidity in tiny markets and propose the separated effects of illiquidity in a capital asset pricing model framework over the whole sample period as well as in two sub-samples, depending on the change in classification of the Portuguese market, from an emerging to a developed one.

Findings – The overall results of the study show that individual illiquidity affects Portuguese stock returns. However, in contrast to previous evidence from other markets, they show that the most traded stocks (hence the most liquid stocks) exhibit larger returns. In addition, they show that the illiquidity effects on stock returns were higher and more significant in the period from January 1988 to November 1997, during which the Portuguese stock market was still an emerging market.

Research limitations/implications – These findings are relevant for investors when they make their investment decisions and for market regulators because they reflect the need of improving the competitiveness of the Portuguese stock market. Additionally, these findings are a challenge for academics because they exhibit the need for providing alternative theories for tiny markets such as the Portuguese one.

Practical implications – The results have important implications for individual and institutional investors who can take into account the peculiar effect of liquidity in stock returns to make proper investment decision.

Originality/value – The Portuguese market provides a natural experimental area to analyse the role of liquidity in asset pricing, because it is a tiny market and during the period studied it changed from an emerging to a developed stock market. Moreover, the authors have to highlight that previous evidence almost

Role of
liquidity in
asset pricing

© María del Mar Miralles-Quirós, José Luis Miralles-Quirós and Celia Oliveira. Published in Journal of Economic Finance and Administrative Science. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial & non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licenses/by/4.0/legalcode

JEL classification – G10, G11, G12

This paper has been financially supported by Junta de Extremadura under the V Action Plan for Research and Development 2014/17 through the GIMAF research group (reference GR15027).
exclusively focuses on the US and major European stock markets, whereas studies for the Portuguese one are scarce. In this context, the study provides an alternative methodological approach with results that differ from those theoretically expected. Thus, these findings are a challenge for academics and open a theoretical and a practical debate.

**Keywords** Portugal, Stock liquidity, Asset pricing, Commonality

**Paper type** Research paper

### 1. Introduction

In recent years, a large part of financial research has been devoted to the study of equity market liquidity. Initial studies focused on the liquidity of individual assets and its impact on returns (Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1996; Datar *et al.*, 1998; Eleswarapu and Reinganum, 1993). However, recent studies have been based on the analysis of commonality in liquidity (Chordia *et al.*, 2000; Hasbrouck and Seppi, 2001; Huberman and Halka, 2001) and demonstrate that individual liquidity co-moves with aggregate or systematic liquidity. Consequently, another strand of liquidity-related studies has emerged, which focuses on the link between asset returns and liquidity risk (Amihud, 2002; Pástor and Stambaugh, 2003; Acharya and Pedersen, 2005). However, these previous studies have focused on the analysis of the US stock market and the evidence for tiny markets as the Portuguese one is limited.

The aim of our study is to analyse the role of liquidity in asset pricing in a tiny market as the Portuguese one. The contribution of our study is two-fold. First, we improve international empirical evidence with an in-depth analysis of the Portuguese stock market over the period 1988-2013. The unique setting of the Lisbon Stock Exchange with regards to changes in classification from an emerging to a developed stock market over the sample period, allows for an original answer to whether changes in the development of the market affect the role of liquidity in asset pricing. Moreover, gathering evidence from other data sets is important to check the robustness of the available results and to avoid the problem of data snooping (Lo and MacKinlay, 1990), as the majority of the empirical results previously reported use of US data. In addition, it is acknowledged that liquidity effects are more pronounced for illiquid assets and markets. So, studying markets that are sufficiently illiquid may allow for a better understanding of the pervasiveness of these effects. In the current study, such a goal is best achieved by selecting the Portuguese stock market in which illiquidity is likely to be an important factor for many of its listed stocks.

Second, we propose and compare two alternative implications of liquidity in asset pricing. More precisely, we adapt the liquidity-adjusted capital asset pricing model (CAPM) proposed by Acharya and Pedersen (2005) for the Portuguese case and suggest two alternative specifications of a liquidity-adjusted CAPM, to separate and compare the effects of liquidity and liquidity risk in asset pricing. Moreover, we use the proportion of zero returns proposed by Lesmond *et al.* (1999), which is an appropriated measure of liquidity in tiny markets such. However, before drawing some overall conclusions, we also evaluate the money-augmented CAPM proposed by Balvers and Huang (2009), which is characterised by adding a risk premium for money growth which can be interpreted as an economy’s liquidity premium. To our knowledge, this is the first study that provides evidence of the M-CAPM for a small and tiny market as the Portuguese one.

Our initial results show that individual illiquidity affects Portuguese stock returns. However, in contrast to previous evidence from other markets, they show that the most traded stocks (hence the most liquid stocks) exhibit larger returns. In addition, we show that the illiquidity effects on stock returns were higher and more significant in the period from
January 1988 to November 1997, during which the Portuguese stock market was still an emerging market. Similar results are provided when the M-CAPM is tested. These findings are relevant for investors when they make their investment decisions and for market regulators because they reflect the need for improving the competitiveness of the Portuguese stock market. Additionally, these findings are a challenge for academics because they exhibit the need for providing alternative theories for tiny markets such as the Portuguese one.

The remainder of the paper is organised as follows: Section 2 presents the literature review. Section 3 describes the data, the liquidity measure and the portfolio formation procedure. The methodology and results of the asset pricing tests are presented and discussed in Section 4. Finally, Section 5 concludes the paper.

2. Previous empirical evidence
Studies about liquidity primarily concentrated on analysing the impact of individual assets liquidity on returns (Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1996; Datar et al., 1998; Eleswarapu and Reinganum, 1993). However, the evidence reported is ambiguous: some authors find a positive relation between asset returns and illiquidity, but others only find such a positive relation in January. The work of Amihud and Mendelson (1986) was one of the first to examine the role of liquidity in asset pricing using the bid–ask spread as a proxy for illiquidity. They document a positive relation between expected return and illiquidity. However, Eleswarapu and Reinganum (1993), who extended the sample period by 10 years, find that the existence of a positive liquidity premium is only limited to January. Brennan and Subrahmanyam (1996) examine the liquidity premium and find a positive return-illiquidity relation even after taking price, size and book to market factors into account in the Fama–French framework. Nevertheless, it is important to note that these authors consider liquidity as a stock characteristic rather than an aggregate risk factor of concern to investors.

The recent relative consensus about the existence of commonality in liquidity raises a new question about the role of liquidity in asset pricing. Therefore, commonality in liquidity could represent a source of non-diversifiable risk, and, in that case, the sensitivity of an individual stock to liquidity shocks could induce the market to require a higher average return. Consistent with this proposition, several authors provide evidence that expected returns are positively related to market-wide liquidity or liquidity risk, such as Pástor and Stambaugh (2003), Amihud (2002), Acharya and Pedersen (2005), Miralles-Marcelo and Miralles-Quirós (2006), among others.

In their seminal paper, Acharya and Pedersen (2005) propose a liquidity-adjusted CAPM (LCAPM), in which a security required return depends on its expected liquidity, as well as on the co-variances of its own return and liquidity with the market return and liquidity. Using the Amihud (2002) illiquidity ratio and stock returns, these authors find some evidence that illiquidity betas are priced in the USA, and that their model is better than the standard CAPM in terms of goodness of fit. Other authors, such as Lee (2011), Papavassiliou (2013), Li et al. (2014) and Butt and Virk (2015) also use the Acharya and Pedersen (2005) model to study the relationship between stock returns and liquidity, respectively.

The work of Lee (2011) is different, as he empirically tests the LCAPM of Acharya and Pedersen (2005) on a global level. The empirical evidence presented is supportive of the LCAPM, in which liquidity risks are priced independently of market risk in international financial markets.

Li et al. (2014) use data from the second largest equity market, Japan, to test whether liquidity and liquidity risk are priced. In consistent with the findings of Acharya and
Pedersen (2005) in the USA, these authors also report evidence that the liquidity-adjusted CAPM is superior to standard CAPM but they only obtain weak evidence for the argument that liquidity risk is priced in addition to the liquidity level and the market risk.

The Acharya and Pedersen (2005) model was also tested in other developed yet small stock markets, such as Greece and Finland. For the Greek stock market, Papavassiliou (2013) provides evidence that liquidity risk is a priced factor, mainly arising from the co-variation of individual liquidity with local market liquidity, and that the level of liquidity seems to be an irrelevant variable in asset pricing. Butt and Virk (2015) use the proportion of the zero-returns illiquidity measure, in addition to the Amihud (2002) illiquidity ratio, to report evidence that a substantial risk premium related to illiquidity risk exists in the Finnish market, and that a liquidity-adjusted CAPM performs better than simple CAPM specifications.

Although this strand of the financial literature is boundless, prior evidence for the Portuguese stock market is scarce. The initial works of Escalda (1993) and Mello and Escalda (1994) were focused on analysing the role of individual liquidity in asset pricing for a sample period in which the Portuguese market was an emerging market. However, subsequent studies, such as those of Pereira and Cutelo (2013) and Miralles-Marcelo et al. (2015), have focused on other aspects of liquidity. More precisely, Pereira and Cutelo (2013) observe that low-price stocks are less liquid than high-price stocks and trade at lower valuation ratios. Finally, they argue that their results do not support any of the existing theories on optimal price per share. On the other hand, Miralles-Marcelo et al. (2015) analyse whether there exists commonality in liquidity in the Portuguese market over the 1988-2011 period. Following the Chordia et al. (2000) methodology, some evidence of commonality in liquidity is found in the Portuguese market when the proportion of zero returns is used as a measure of liquidity. However, they do not take into account the change from an emerging to a developed market.

In this context, in the present study for the Portuguese stock market, we analyse the effects of liquidity in asset pricing, both as an individual characteristic of financial assets, like the initial studies, and as a source of systematic risk, like more recent studies. Moreover, we analyse possible changes affected by the evolution of this market into a developed one.

3. Data
In this study, we use monthly and daily data for the period from 2 January 1988 to 31 December 2013, retrieved from Thomson Datastream. The data obtained include the following variables: price, trading volume, market capitalisation and book-to-market ratio.

We select all stocks traded in the Euronext Lisbon Stock Exchange with available data for at least 24 months. The final sample is composed of 233 different stocks, which were traded during some period of time between 1988 and 2013.

The return of the market portfolio is proxied by the equally-weighted return of all stocks available in each month of the sample. And, as Portugal did not have short-term government securities during most of the period covered by this study, we proxy the risk-free rate of return by the equivalent monthly Interbank Money Market Overnight interest rate. Data on this interest rate are taken from BPstat Estatisticas online from Banco de Portugal, which is an internet online access to the Banco de Portugal Statistical Interactive Database[1].

Finally, we have to highlight that, over the sample period studied in this paper, some important events affected the Portuguese stock market’s evolution, namely, its classification as a developed stock market by Standard & Poor’s and Morgan Stanley Capital International in 1997; its merger with Euronext N.V. in 2002 and its consequent integration in the Euronext platform; and later, in 2007, owing to the acquisition of Euronext by NYSE,
its integration in the world’s biggest stock market platform, which consolidated its internationalisation. The merger of the Portuguese stock market with Euronext in 2002 did not bring about many fundamental changes. The consolidated Euronext exchange maintained the market structure of the participating exchanges, and the main implication of the unification was to make cross-border trading easier (Nielsson, 2009). Therefore, it seems important to study the effects of the 1997 classification event[2].

3.1. The illiquidity measure
Following recent evidence for the Portuguese stock market (Miralles-Marcelo et al., 2015), we construct for each asset a monthly time series for the monthly proportion of zero returns, ZR, computed as the number of daily zero returns, \( \#ZR \) divided by the total number of transactions days in each month, \( D \):

\[
ZR = \frac{\#ZR}{D}
\] (1)

As argued by Lesmond et al. (1999), securities with high transaction costs will have less frequent price movements and more zero returns than securities with low transaction costs. So, the occurrence of zero returns can be considered a measure of illiquidity. The biggest advantage of this measure is that it only requires a time series of daily equity returns. Moreover, Bekaert et al. (2007) and Goyenko et al. (2009) demonstrated that this measure is correlated with finer spread and price impact proxies estimated from low frequency data.

Table I presents summary statistics for this illiquidity measure for the entire sample period and for two subsample periods: the period from January 1988 to November 1997, during which the Portuguese stock market was still an emerging market, and the period from December 1997 to December 2013 when it became a developed stock market[3]. During the entire sample period, the average ZR is 56.689 per cent, which means that on average there are 56.689 per cent of days during which there were no price movements. As expected, in the emerging market sample period the average illiquidity is higher than in the period after the classification as a developed stock market. Actually, ZR average is 61.026 per cent in the first sub-period which contrasts to an average of 53.645 per cent in the later period.

Monthly aggregated illiquidity or market illiquidity is computed for each month as the average of the illiquidity measure across all sample stocks. Figure 1 plots market illiquidity during 1988-2013. As can be seen, it is at the beginning of 1993 that illiquidity reaches its highest levels and starts to decline from that year onwards. This improvement in liquidity is because of the reorganisation and regulation of the Portuguese stock market, which led to its international recognition as a developed market in 1997. In 1998/1999 illiquidity rises were
caused by the instability related to the Asian and Russian crisis. The end of the speculative bubble in the year 2000 also contributed to the deterioration of the liquidity levels. Afterwards, stock market liquidity was negatively affected by the worldwide financial crisis of 2007/2008, which was followed by the strong economic recession and sovereign debt crisis in the Eurozone, and the international financial assistance programme to the Portuguese economy. These more recent financial crises are well reflected in increasing ZR.

3.2. Portfolios formation procedure
The limited number of listed stocks in Euronext Lisbon constrains the use of a large cross-section of portfolios with respect to a particular stock characteristic. Moreover, we take into account the suggestion of Lewellen et al. (2010) who show that for returns with a covariance structure similar to the risks factors, loading on any proposed factor will line up with the true expected returns as long as the factor weakly correlates with the common source of variation in returns. Thus, using portfolios constructed on the same basis as the risk factor may generate high cross-sectional $R^2$-squared values even though this factor is not able to explain the cross-section of true expected returns.

For those reasons, we include portfolios based on four different stock characteristics: liquidity, size, B/M and systematic market risk. The availability of 20 characteristic portfolios provides an adequate number of test portfolios for the statistical power of cross-sectional tests.

The portfolio formation methodology consists of three steps. First, all sample stocks are ranked in ascending order of the stock characteristic. Second, based on the previous year’s stock characteristic, stocks are divided into five groups with approximately the same number of stocks. Third, the portfolio composition is revised every December and maintained throughout the following year. To be included in a portfolio, stocks must have been traded from January to December of year $t$. 

![Figure 1. Portuguese stock market illiquidity](image)

**Note:** Stock market illiquidity is computed as the average in each month of the proportion of zero returns (ZR) illiquidity measure for all stocks in the sample. The red line marks the date when the Portuguese stock market was classified as a developed market. Own elaboration
The size, B/M and beta risk portfolios are ranked on the year-end information, considering the values of December of each year. The quintile portfolios increase in size, B/M and beta risk. This means that for size portfolios, S1 represents the smallest year-end market capitalised firms and S5 represents the largest year-end market capitalised firms. Regarding B/M, the BM1 portfolio contains the 20 per cent of stocks with the lowest B/M in December of each year, and BM5 contains the 20 per cent of stocks with the highest B/M. With respect to beta risk, B1 is the portfolio that contains the 20 per cent of stocks with the lowest beta risk in December of each year and B5 is the portfolio containing the 20 per cent of stocks with the highest beta. The liquidity portfolios are ranked on annual information, based on the values of ZR computed with annual frequency. The liquidity quintile portfolios increase in liquidity, so the stocks are sorted in descending order ZR. Therefore, L1 represents the most illiquid stocks and L5 contains the most liquid stocks in our sample.

For each month and portfolio, we calculate the equally-weighted returns and illiquidity. We use the equal weighting scheme for the test portfolios, as this seems to be the usual methodology followed by liquidity-related studies.

Summary statistics for test portfolios are presented in Table II. This table shows that sorting based on previous year illiquidity allows for computing portfolios whose average liquidity ascends from L1 to L5. This means that illiquidity is persistent and less liquid assets in the previous year tend to be less liquid for a long time. This result justifies the estimation of liquidity innovations using autoregressive models, as explained in Section 5. Moreover, there is no evidence of a relation between average portfolio returns and liquidity, which could suggest that it is not liquidity level but rather liquidity shocks that affect stock returns. Almost all portfolios exhibit average negative returns in the period 1988-2013. The only exception is the BM5 portfolio that has an average return of 0.555 per cent. This negative return can be explained by the high losses experienced in the stock market during the post-dot-com bubble and the financial crisis periods.

As expected, market value increases with liquidity because the most liquid stocks are also the stocks of firms with the largest capitalisation. Also, B/M ratio decreases with liquidity, suggesting that the least liquid stocks are also the ones less profitable or relatively distressed.

4. Asset pricing with liquidity

Previous empirical evidence suggests that there is commonality in illiquidity in Portugal (Miralles-Marcelo et al., 2015). In this sense, Chordia et al. (2000) argue, commonality in liquidity could represent a source of systematic risk, and in that case the sensitivity of an individual stock to liquidity shocks could induce the market to require a higher average return. Hence, in this section, we analyse the role of liquidity in asset pricing, within the context of CAPM and Acharya and Pedersen (2005) models. Our main goal is to ascertain whether liquidity level and/or liquidity risk is priced in the Portuguese stock market.

4.1 Liquidity-adjusted pricing model

The CAPM of Sharpe (1964), Lintner (1965) and Mossin (1966) is, for its simplicity, a very attractive model for investigation. This model states that the expected excess return of an asset is proportional to its covariance with market returns; thus, the only risk factor that matters is the market beta. Nevertheless, it seems to have had limited empirical ability to explain asset returns in recent times, and some studies reveal that the CAPM model cannot explain the expected returns from some investment strategies based on firm characteristics such as liquidity.
In this context, Acharya and Pedersen (2005) developed LCAPM. This model provides a unified framework for understanding the various channels through which liquidity risk may affect asset prices. As in the standard CAPM, in the LCAPM model, the required return on an asset increases linearly with the market beta, that is covariance between the asset return and the market return. However, this model also yields three additional effects which could be regarded as three forms of liquidity risks. The first effect is that the return increases with the covariance between the asset illiquidity and the market illiquidity. The second effect on expected returns is because of co-variation between the asset illiquidity and the market illiquidity. The third effect on required returns is because of co-variation between security illiquidity and the market return.

We consider that the LCAPM model combines the two main arguments related to the consideration of illiquidity in asset pricing. The first argument is that illiquidity is a stock characteristic that acts as a market friction because individual illiquidity reduces stock returns. The second argument is that illiquidity is a source of systematic risk and that it is important to measure the co-movements between asset returns and market illiquidity.

### Table II

Summary statistics for test portfolios

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Return</th>
<th>Market value</th>
<th>B/M ratio</th>
<th>Beta</th>
<th>ZR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Size sorted portfolios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>−0.580</td>
<td>46</td>
<td>10.489</td>
<td>1.089</td>
<td>80.066</td>
</tr>
<tr>
<td>S2</td>
<td>−0.160</td>
<td>248</td>
<td>1.373</td>
<td>0.771</td>
<td>61.609</td>
</tr>
<tr>
<td>S3</td>
<td>−0.427</td>
<td>892</td>
<td>1.263</td>
<td>0.924</td>
<td>49.052</td>
</tr>
<tr>
<td>S4</td>
<td>−0.427</td>
<td>3,921</td>
<td>0.931</td>
<td>1.072</td>
<td>39.946</td>
</tr>
<tr>
<td>S5</td>
<td>−0.267</td>
<td>71,292</td>
<td>0.660</td>
<td>1.086</td>
<td>25.292</td>
</tr>
<tr>
<td><strong>Panel B: B/M ratio sorted portfolios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BM1</td>
<td>−0.316</td>
<td>22,453</td>
<td>0.369</td>
<td>1.043</td>
<td>40.126</td>
</tr>
<tr>
<td>BM2</td>
<td>−0.540</td>
<td>24,034</td>
<td>0.651</td>
<td>0.979</td>
<td>36.683</td>
</tr>
<tr>
<td>BM3</td>
<td>−0.326</td>
<td>25,562</td>
<td>0.915</td>
<td>0.920</td>
<td>41.249</td>
</tr>
<tr>
<td>BM4</td>
<td>−0.219</td>
<td>3,179</td>
<td>1.242</td>
<td>1.001</td>
<td>47.745</td>
</tr>
<tr>
<td>BM5</td>
<td>0.555</td>
<td>607</td>
<td>3.554</td>
<td>1.204</td>
<td>61.575</td>
</tr>
<tr>
<td><strong>Panel C: Systematic market risk (beta) sorted portfolios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1</td>
<td>−0.147</td>
<td>7,732</td>
<td>0.920</td>
<td>0.608</td>
<td>70.328</td>
</tr>
<tr>
<td>B2</td>
<td>−0.545</td>
<td>16,240</td>
<td>0.634</td>
<td>0.785</td>
<td>52.282</td>
</tr>
<tr>
<td>B3</td>
<td>−0.360</td>
<td>18,184</td>
<td>0.670</td>
<td>0.982</td>
<td>43.290</td>
</tr>
<tr>
<td>B4</td>
<td>−0.440</td>
<td>15,302</td>
<td>0.729</td>
<td>1.139</td>
<td>41.126</td>
</tr>
<tr>
<td>B5</td>
<td>−0.423</td>
<td>16,297</td>
<td>0.819</td>
<td>1.445</td>
<td>45.433</td>
</tr>
<tr>
<td><strong>Panel D: Liquidity sorted portfolios</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1</td>
<td>−0.310</td>
<td>1,367</td>
<td>0.945</td>
<td>0.773</td>
<td>88.542</td>
</tr>
<tr>
<td>L2</td>
<td>−0.559</td>
<td>1,207</td>
<td>1.446</td>
<td>0.951</td>
<td>76.162</td>
</tr>
<tr>
<td>L3</td>
<td>−0.584</td>
<td>2,983</td>
<td>0.864</td>
<td>1.081</td>
<td>51.283</td>
</tr>
<tr>
<td>L4</td>
<td>−0.343</td>
<td>8,788</td>
<td>0.826</td>
<td>1.156</td>
<td>33.455</td>
</tr>
<tr>
<td>L5</td>
<td>−0.326</td>
<td>54,128</td>
<td>0.725</td>
<td>1.281</td>
<td>20.845</td>
</tr>
</tbody>
</table>

**Note:** Summary statistics for equally-weighted quintile portfolios formed in ascending order of market capitalisation (Panel A), B/M ratio (Panel B) and systematic risk beta (Panel C), and in descending order of ZR illiquidity measure, thus in ascending order of liquidity (Panel D). This table reports monthly averages of returns (in %), market value (in millions of euros), B/M ratio and ZR (in %). Beta corresponds to the systematic risk coefficient estimated with all sample values. The sample period is from January 1988 to December 2013. Own elaboration.
However, because of the inter-relation of these two arguments, it is not possible to know for sure which effect dominates.

Therefore, to ascertain whether liquidity level and/or liquidity risk is priced in the Portuguese stock market, we consider the separated effects of illiquidity in the CAPM framework. The equation (2) model incorporates illiquidity as a market friction, whereas the equation (3) model considers illiquidity as a source of systematic risk:

\[
E_t(r_{it+1} - c_{it+1}) = r_f + \lambda_t \frac{\text{cov}_t(r_{it+1} - c_{it+1}, r_{M,t+1})}{\text{var}_t(r_{M,t+1})}
\]  
(2)

\[
E_t(r_{it+1}) = r_f + \lambda_t \frac{\text{cov}_t(r_{it+1}, r_{M,t+1} - c_{M,t+1})}{\text{var}_t(r_{M,t+1} - c_{M,t+1})}
\]  
(3)

Equation (3) can be written as:

\[
E_t(r_{it+1}) = r_f + \lambda_t \frac{\text{cov}_t(r_{it+1}, r_{M,t+1} - c_{M,t+1})}{\text{var}_t(r_{M,t+1} - c_{M,t+1})} - \lambda_t \frac{\text{cov}_t(r_{it+1}, c_{M,t+1})}{\text{var}_t(r_{M,t+1} - c_{M,t+1})}
\]  
(4)

### 4.2. Innovation in return and illiquidity

Empirical literature shows that liquidity is time-varying and persistent. The persistence of liquidity implies that liquidity predicts future returns and co-moves with contemporaneous returns. So, as reported by Acharya and Pedersen (2005) and Butt and Virk (2015), we use innovations instead of original series in our empirical analysis. Moreover, using innovations also circumvents the stationarity issues, given the high persistence in the levels of illiquidity series. The innovations in portfolio and market illiquidity are gathered by imposing ARMA \((p, q)\) structures, where \(p\) is the lag length for the autoregressive term and \(q\) is the lag length of the moving average term:

\[
c_t = \omega + \sum_{j=1}^{p} \phi_j c_{t-j} + \sum_{k=1}^{q} \varphi_k \varepsilon_{t-k} + \varepsilon_t
\]  
(5)

In equation (5), an algorithm that selects the best adjustment according to Akaike’s information criteria chooses the lag order. We also collect innovations in the aggregate market return series using the same methodology.

Illiquidity innovations are computed as the difference between total and expected illiquidity, that is:

\[
\tilde{c}_t = c_t - E(c_t) = \varepsilon_t
\]  
(6)

### 4.3. Model testing

The models of equations (2) and (4) translate into the following unconditional testable model equations:

\[
r_{pt} - r_{ft} = \alpha + \kappa \tilde{c}_{pt} + \lambda \beta_{pt} + \mu_{pt}
\]  
(7)

where
These cross-sectional specifications are tested using the Fama and Macbeth (1973) three-step procedure. In the first step, for each of the 20 test portfolios, we compute the time series for each beta coefficient with 36 previous monthly observations. In the second step, we estimate in cross-section equations (7) and (9) models, where the betas are the ones estimated in the first step. Finally, in the third step, based on the sampling distribution mean and standard error of the risk factors’ premiums ($\lambda$), we compute the $t$-statistics.

The results are presented in Table III. When illiquidity is incorporated as a friction, the results show that the relation between returns and systematic risk is insignificant[6]. The level of illiquidity is negatively priced, which suggests that most liquid portfolios earn a higher return or a less negative return, as the average portfolio’s returns are negative in the period studied. On the other hand, for the model of equation (9), the results show that the estimated risk premiums are insignificant and only the constant is negative and significant at the 5 per cent level.

These results confirm the idea that in the Portuguese stock market individual illiquidity acts as a market friction that is priced. Additionally, in contrast to empirical evidence reported from other countries, there is no illiquidity premium as most liquid portfolios are the ones that exhibit higher risk-adjusted returns. However, the evidence of an illiquidity discount is consistent with Nguyen and Lo (2013) for New Zealand, which is also a developed but small stock market like the Portuguese one[7].

4.4. Model testing for subsample periods
To ascertain whether the efforts made to reorganise and regulate the Portuguese stock market that result in its classification as developed alter the role of liquidity in asset pricing, we tested the asset pricing models presented before with two subsamples. The first subsample corresponds to the emerging market period and comprises the period from
January 1988 to November 1997. The other subsample corresponds to the developed period and consists of the period from December 1997 to December 2013.

The results of the estimation of equations (6) and (8) models using Fama and Macbeth (1973) methodology for each subsample period are presented in Table IV. Again, the results confirm that, in the Portuguese stock market systematic illiquidity risk is not priced but the level of illiquidity is. In fact, the estimates of the illiquidity level obtained are negative and significant at the 5 per cent level: \(-6.636\) in the emerging market period and \(-5.237\) in the developed market period.

As before, these results support that individual illiquidity is negatively priced for the ZR illiquidity measure, suggesting that most liquid portfolios earn a less negative return. Nevertheless, this illiquidity discount is stronger in the first part of our sample period. This is consistent with previous evidence reported for the Portuguese stock market[8].

### 4.5. The money-augmented CAPM

Before drawing some overall conclusions, it is instructive to conduct additional tests. In this sense, we evaluate an alternative implication of liquidity in asset pricing. In particular, we consider the aggregate level of liquidity in the Portuguese economy instead of individual liquidity or the aggregate level of liquidity in the stock market. To that end, we use the money-augmented CAPM proposed by Balvers and Huang (2009).

Under the rationale that the availability of money is a source of liquidity that facilitates transactions, affects the marginal value of wealth and contributes to the economy via several mechanisms, Balvers and Huang (2009) introduced money to the CAPM as we can see in equation (14):

\[
  r_{pt} - r_{ft} = \alpha + \lambda \beta_{pt} + \lambda_{gM} \beta_{gM} + \mu_{pt}
\]

where the additional risk factor is the real money growth computed as the growth rate of the monetary aggregate \(M2\) deflated by the consumer price index. For the Portuguese case, these series are available from the Banco de Portugal.

---

**Table III. Illiquidity-adjusted CAPM**

<table>
<thead>
<tr>
<th>Constant</th>
<th>(\hat{c})</th>
<th>(\beta)</th>
<th>(\beta_1)</th>
<th>(\beta_2)</th>
<th>Adjusted (R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friction</td>
<td>(-0.788***) (-2.28)</td>
<td>-6.516*** (-4.12)</td>
<td>0.142 (0.40)</td>
<td></td>
<td>0.139</td>
</tr>
<tr>
<td>Systematic risk</td>
<td>(-0.940***) (-2.59)</td>
<td>0.207 (0.52)</td>
<td>-0.002 (-0.35)</td>
<td></td>
<td>0.164</td>
</tr>
</tbody>
</table>

Notes: This table reports the time series average of the monthly coefficients in cross-sectional asset pricing tests using Fama–Macbeth’s methodology for the period of 1988-2013. The cross-sectional regressions for each month are:

\[
  r_{pt} - r_{ft} = \alpha + \kappa c_{pt} + \lambda \beta_{pt} + \mu_{pt}
\]

\[
  r_{pt} - r_{ft} = \alpha + \lambda_1 \beta_{1pt} + \lambda_2 \beta_{2pt} + \mu_{pt}
\]

The dependent variable is the monthly return for 20 equally-weighted quintile portfolios formed in ascending order of market capitalisation, B/M ratio and systematic risk beta and in descending order of ZR illiquidity measure. The explanatory variables are the betas of the different factors estimated with the data of 36 previous months. Each coefficient represents the risk premium associated with each risk factor. In parentheses we report the Fama–Macbeth \(t\)-statistic. Adjusted \(R^2\) is computed as the monthly average of cross-sectional adjusted \(R^2\); *, ** and *** denote significance at the 10, 5 and 1 per cent levels, respectively. Own elaboration
Table V provides the Fama and Macbeth (1973) estimates of this alternative model for the entire sample period, as well as for each subsample period (the January 1988-November 1997 emerging market period and the December 1997-December 2013 developed market period). The goodness of fit of this alternative asset pricing model is in line with the one obtained for the Acharya and Pedersen (2005) LCAPM, with adjusted $R^2$ between 15 and 19 per cent. The coefficients are also in line with previous results. The intercepts imply a risk-adjusted return that is negative and significant for the period studied and, especially, for the first part of our sample period. The systematic risk premium is positive but insignificant, and the risk premium for monetary growth is negative and significant for the entire sample but insignificant for both sub-samples. These results confirm the results obtained for the Acharya and Pedersen (2005) LCAPM and, as before, suggest that in Portugal there exists a negative premium for liquidity.

5. Conclusions
In this paper, we examine whether liquidity levels and liquidity risk are priced in the Portuguese stock market. The motivation for our study is provided by the growing interest in stock liquidity that has emerged in literature over recent years and the multiple roles that liquidity could play in asset pricing, as liquidity could represent a desirable stock characteristic and/or a source of systematic risk which is priced with a higher return.

In contrast to the extant literature, this study examines the role of liquidity in the Euronext Lisbon Stock Exchange over a 26-year period. Regarding the role of illiquidity in asset pricing, the evidence found weakly supports liquidity-adjusted or money-adjusted models. Nevertheless, the results show that individual illiquidity is priced, as the estimates of individual illiquidity coefficients are significant although negative for the proportion of zero returns measure, within a CAPM augmented by the illiquidity
level framework. These findings suggest it is individual illiquidity, not systematic illiquidity, which matters most to Portuguese investors and that there is an inverse relation between returns and the proportion of zero returns illiquidity measure. This is consistent with previous evidence reported for the Portuguese stock market. Similar results were also reported by Nguyen and Lo (2013) for New Zealand, a developed but small stock market such as the Portuguese one. Moreover, we show that there exists a negative risk premium for money growth in the Portuguese market over the entire sample period, which can be interpreted as a negative economy’s liquidity premium.

These particular findings are not only relevant for academics but also for practitioners. In spite of the effort made to increase the international visibility of the Portuguese stock market, there are no substantial improvements in terms of its liquidity and alternative theories about the role of liquidity in asset pricing should be provided for tiny markets as the Portuguese one. Moreover, we show that there exists a negative risk premium for money growth in the Portuguese market over the entire sample period, which can be interpreted as a negative economy’s liquidity premium.

Notes

1. Available at www.bportugal.pt/EstatisticasWEB.
3. Outliers at the upper and lower 1 per cent tails of the illiquidity variable are discarded.
4. This procedure was also adopted by López et al. (2009), Miralles-Marcelo, Miralles-Quirós and Miralles-Quirós (2013), Butt (2013) and Butt and Virk (2015) among others.
5. Systematic market risk is estimated as the market beta of the traditional market model with 36 previous months’ observations of stock and market returns.
6. Many studies fail to identify a robust and significant relation between risk and return on the aggregate stock market portfolio (Baillie and DeGennaro, 1990; Bollerslev and Zhou, 2006; Campbell and Hentschel, 1992; French et al., 1987; Glosten et al., 1993; Harrison and Zhang, 1999).

Table V.

<table>
<thead>
<tr>
<th>Samples</th>
<th>Constant</th>
<th>$\beta$</th>
<th>$\beta_{g_m}$</th>
<th>Adjusted $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sample period</td>
<td>-0.946**(-2.84)</td>
<td>0.282 (0.84)</td>
<td>-0.401* (-1.84)</td>
<td>0.152</td>
</tr>
<tr>
<td>Emerging market sample period</td>
<td>-1.808***(-3.32)</td>
<td>0.758 (1.22)</td>
<td>-0.391* (-1.18)</td>
<td>0.188</td>
</tr>
<tr>
<td>Developed market sample period</td>
<td>-0.575 (-1.40)</td>
<td>0.078 (0.20)</td>
<td>-0.405 (-1.46)</td>
<td>0.180</td>
</tr>
</tbody>
</table>

Notes: This table reports the time series average of the monthly coefficients in cross-sectional asset pricing tests using Fama–Macbeth’s methodology for the entire sample period of as well for the two sub-sample periods. The cross-sectional regressions for each month are:

$$r_{pt} - r_{ft} = \alpha + \lambda \beta_{pt} + \lambda_{g_m} \beta_{g_mpt} + \mu_{pt}$$

The dependent variable is the monthly return for 20 equally-weighted quintile portfolios formed in ascending order of market capitalisation, B/M ratio and systematic risk beta and in descending order of ZR illiquidity measure. The explanatory variables are the betas of the different factors estimated with the data of 36 previous months. Each coefficient represents the risk premium associated with each risk factor (market return innovations and real money growth). In parentheses we report the Fama–Macbeth $t$-statistic. Adjusted $R^2$ is computed as the monthly average of cross-sectional adjusted $R^2$; *, ** and *** denote significance at the 10, 5 and 1% levels, respectively. Own elaboration

Role of liquidity in asset pricing
7. We have also evaluated the traditional CAPM and the Fama and French (1993) three-factor model, as well as illiquidity augmented versions of these models with similar findings. These results are available upon request.

8. Mello and Escalda (1994) use monthly data from 1988 to 1993 to compute different proxies for liquidity, as the proportional quoted bid-ask spread, trading frequency and turnover rate. They only consider liquidity as a stock characteristic and their results reveal that liquidity affects Portuguese stock returns and that most traded stocks (hence most liquid stocks) exhibit larger returns.

References


**About the authors**

María del Mar Miralles-Quirós is an Associate Professor of Financial Economics at the Universidad de Extremadura in Spain and Director of the Research Group on Financial Assets and Markets (GIMAF). She is the author of numerous research articles, books and book chapters in the field of finance that deal with asset valuation and optimisation, liquidity and risk in stock markets and socially responsible investment strategies. She has directed various PhD theses. In the management area, she has been Deputy Dean of Institutional Relations of the Faculty of Economics and Business Sciences of the Universidad de Extremadura, where she is currently teaching the subject of Mathematics of Financial Operations. María del Mar Miralles-Quirós is the corresponding author and can be contacted at: marmiralles@unex.es

Celia Oliveira is an Associate Professor at the Polytechnic Institute of Leiria in Portugal, where she teaches financial valuation in the School of Management. She holds her PhD in Economics and Business from the Universidad de Extremadura in Spain. Her doctoral thesis was entitled “The role of liquidity in asset pricing: the Portuguese case” and the present study is part of this research.

For instructions on how to order reprints of this article, please visit our website: [www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: permissions@emeraldinsight.com
The use of the recognition heuristic as an investment strategy in European stock markets

Júlio Lobão
School of Economics and Management, University of Porto, Porto, Portugal

Luis Pacheco
Department of Economics, Management and Computer Sciences, Portucalense University, Porto, Portugal and

Carlos Pereira
School of Economics and Management, University of Porto, Porto, Portugal

Abstract

Purpose – People often face constraints such as a lack of time or information in taking decisions, which leads them to use heuristics. In these situations, fast and frugal rules may be useful for making adaptive decisions with fewer resources, even if it leads to suboptimal choices. When applied to financial markets, the recognition heuristic predicts that investors acquire the stocks that they are aware of, thereby inflating the price of the most recognized stocks. This paper aims to study the profitability against the market of the most recognized stocks in Europe.

Design/methodology/approach – In this paper, the authors perform a survey and use Google Trends to study the profitability against the market of the most recognized stocks in Europe.

Findings – The authors conclude that a recognition heuristic portfolio yields poorer returns than a market portfolio. In contrast, from the data collected on Google Trends, weak evidence was found that strong increases in companies monthly search volumes may lead to abnormal returns in the following month.

Research limitations/implications – The applied investment strategy does not account for transaction costs, which may jeopardize its profitability given the fact that it is necessary to revise the portfolio on a monthly basis. Despite the results obtained, they are useful to understanding the performance of recognition heuristic strategies over a comprehensive time horizon, and it would be interesting to depict its viability during different market conditions. This analysis could provide additional information about a preferable scenario for employing our strategies and, ultimately, enhance the profitability of recognition heuristic strategies.

Practical implications – Through the exhaustive analysis performed here on the recognition heuristic in the European stock market, it is possible to conclude that no evidence was found for the viability of exploring this type of strategy. In fact, the investors would always gain better returns when adopting a passive investment strategy. Therefore, it would be wise to assume that the European market presents at least a degree of efficiency where no investment would yield abnormal returns following the recognition heuristic.

Originality/value – The main objective of this paper is to study the performance of the recognition heuristic in the financial markets and to contribute to the knowledge in this field. Although many authors
have already studied this heuristic when applied to financial markets, there is a lack of consensus in the literature.

**Keywords** Investment decisions, Behavioural finance, Stock returns, Financial market, Recognition heuristic

**Paper type** Research paper

1. Introduction

The recognition heuristic has its origins in psychology and tends to be described as a fast and frugal way of thinking to take decisions in a bounded rationality scenario.

Neoclassical financial theory assumes that individuals are fully rational and always take the optimal decision when facing a problem. However, despite support by several authors, that thought is not very realistic, as individuals often face various conditions that may lead to rational restrictions, such as inadequate time to take the decision or a lack of information. Hence, heuristics are useful to taking some shortcuts to decide faster and with fewer resources, even if that leads to suboptimal decisions. The recognition heuristic predicts that when facing a challenge to choose between two objects and only one of them is familiar, the individual will always choose the familiar object.

Introducing this concept in financial markets would be interesting to study if the most recognized stocks provide abnormal returns on a consistent basis as the result of individuals choosing to buy the stocks they are most familiar with. This would contribute to the discussion of the efficient market hypothesis (Fama, 1970) that states that no investment strategy can beat the market consistently. In recent years, the behavioural approach has also emerged, stating that financial markets are made up of individuals who can make irrational decisions, leading to inefficiencies in financial markets (Akerlof and Shiller, 2010).

The main authors who link recognition heuristic with financial markets are Borges et al. (1999), Boyd (2001) and Andersson and Rakow (2007). Nevertheless, these three studies reflect the lack of consensus about this topic, suggesting that further studies may be relevant contributions to the literature. The main objective of this paper is to study whether recognized stocks produce abnormal returns on a consistent basis. In other words, the objective is to investigate whether a portfolio constructed of the most recognized stocks of a given economy may consistently beat the market portfolio.

Following the same approach as Borges et al. (1999), Boyd (2001) and Andersson and Rakow (2007), a survey was performed to infer which stocks from the STOXX® Europe 50 are most recognized. The survey was given to 272 participants and two portfolios were constructed: the recognized portfolio and unrecognized portfolio. The performance of each portfolio was compared with the market portfolio to infer if the recognition heuristic strategy yields better returns than the market. We concluded that investing in the European market based on individual’s “ignorance” does not produce any excess return.

To complement the paper, an additional methodology based on Google Trends was adopted. The use of this tool was considered as relevant to study recognition heuristic, as search volume may be used as a proxy for investor recognition. In other words, it is expected that the most recognized companies get greater investor attention on the web than the less recognized companies. As in Bank et al. (2011), three equal-sized portfolios were constructed each month: one compiled of the companies whose search volume increased the most, another of companies for whom the search volume most decreased and another of the remaining companies. Then two investment strategies relying on the recognition heuristic were tested during the period under analysis. To verify the performance of each investment strategy, the returns obtained were regressed against the risk factors included in three
relevant market models: CAPM (Treynor, 1961, 1962; Sharpe, 1964; Lintner, 1965; Mossin, 1966), three-factor model (Fama and French, 1993) and Carhart (1997) four-factor model. Jensen’s (1968) alpha was estimated to infer whether the designed investment strategies could beat the market on a consistent basis. The results showed that following a strategy based on the recognition heuristic principles it is possible to yield weak, statistically insignificant abnormal returns on a consistent basis. This investment strategy would imply having to modify the portfolio on a monthly basis, which could lead to high transaction costs that would absorb the profit of the strategy.

This paper is organized in five sections. The second section presents the literature review with the relevant authors, the third section discusses the methodologies used and the fourth section presents and analyses the results. Finally, in the fifth section, we present the main conclusions.

2. Literature review

2.1 Recognition heuristic

The recognition heuristic concept was introduced by Gigerenzer and Goldstein (1996) and Goldstein and Gigerenzer (1999, 2002). The authors intended to “exploit the vast and efficient capacity of recognition to make inferences about unknown aspects of the world” (Goldstein and Gigerenzer, 1999, p. 4).

To understand what the recognition heuristic is:

[...] consider the task of inferring which of two objects has a higher value for some criterion (e.g. which is faster, higher and stronger). The recognition heuristic for such a task is simply stated: if one of the two objects is recognized and the other is not, then infer that the recognized object has the higher value (Goldstein and Gigerenzer, 1999, p. 41).

The heuristic is non-compensatory, which means that no other information aside from recognition is taken into account in the judgment (Goldstein and Gigerenzer, 1999). This feature is also known as the less-is-more (LiME) effect. To prove this feature, Goldstein and Gigerenzer (2002) performed a test where they asked about a dozen Americans and Germans the city with the higher population – San Diego or San Antonio. About two-thirds of the Americans chose San Diego correctly, while all the German (with significantly less knowledge) answered correctly. The impressive result obtained from the German group was due to a simple fact: all the Germans tested had heard about San Diego before, and about half of them did not recognize San Antonio. This process is counterintuitive as it is shown that people with less knowledge can make better choices than people with broader knowledge about the topic.

The recognition heuristic cannot be applied to every situation or even to making correct inferences using it. The recognition heuristic is domain-specific, so it only works in environments where recognition is correlated with the criterion. According to Goldstein and Gigerenzer (1999, p. 44) “ignorance is beneficial if it is correlated with what one wishes to infer”. For instance, because city size is positively associated with recognition, the recognition heuristic would predict that recognized cities would be judged as larger than unrecognized cities. Moreover, it is important to bear in mind that the recognition heuristic “does not apply to situations in which people already have conclusive criterion knowledge about the objects, which allows a response to be deduced” (Pachur et al., 2011, p. 2).

Recognition may be also easily misunderstood with completely different notions such as availability (Tversky and Kahneman, 1974) and familiarity (Griggs and Cox, 1982). As stated by Goldstein and Gigerenzer (2002, p. 77), the availability heuristic is based on recall, not recognition, with people recognizing far more items than they can recall. According to
these authors, availability is a graded distinction among items in memory, and it is measured by the order or speed with which they come to mind or the number of instances of categories one can generate. On the other hand, the term “familiarity” is typically used in the literature to denote the degree of knowledge (or amount of experience) a person has of a task or object.

Pachur et al. (2011, p. 4) mention that collective recognition (i.e. the proportion of people in some population that recognize the object) as used by several authors for their method of analysis, are not direct implementations of the recognition heuristic, but models of individual recognition. Nevertheless, some caution is required with this type of analysis as:

[... ] the cognitive processes involved would be different from the recognition heuristic (e.g. including recall of the collective recognition rates or their estimation in other ways, such as by the number of people observed to have chosen some option).

2.2 Recognition heuristic applied to financial markets
Merton (1987) highlighted the concept of recognition in presuming that investor attention may be relevant to stock pricing. The “investor recognition hypothesis” holds that in informationally incomplete markets, investors are not aware of all securities available for investment. Therefore, stocks with lower investor recognition need to offer higher returns to compensate their investors for being long in securities with less information available and less media coverage. Consequently, in theory, stocks with higher investor recognition earn lower returns than stocks with lower visibility. Several authors found a relationship between media coverage and returns (Engelberg and Parsons, 2011; Tetlock, 2007, 2011; Hillert et al., 2014; Lou, 2014). For instance, Fang and Peress (2009) empirically found a stable, negative relationship between media coverage and required rate of return and attributed that finding to the effect highlighted by Merton (1987).

Borges et al. (1999) were the first authors to implement the recognition heuristic in building portfolio strategies. The idea was to take advantage of a fast and frugal decision process to see if it was possible to compile a better portfolio with less knowledge than an investor would with access to plenty of information and resources. As the authors state, “the tools and information professional investment firms use for investment decisions are far beyond the ordinary person’s reach” (Borges et al., 1999, p. 59). The idea was to take advantage of the recognition heuristic and form an investment portfolio relying only on one piece of information: company name recognition. No other information would be necessary (e.g. firm’s fundamentals, price, financial indicators, etc.).

Financial markets are quite complex and few investors are able to consistently beat the market over the years. The efficient market hypothesis (EMH) introduced by Fama (1970) assumes that investors are unboundedly rational, which leads to the conclusion that no one can consistently achieve higher returns than the market on a risk-adjusted basis, given the information available at the time the investment is made.

Borges et al. (1999) constructed several portfolios of stocks using name recognition of 500 American stocks and 298 German stocks (companies listed on the S&P500 and Dax 30) by American laypeople and experts as well as German laypeople and experts, with a total of 480 people surveyed. On the basis of the survey, eight recognition-based portfolios were built. The “domestic recognition” portfolios were compiled of stocks that more than 90 percent of the participants recognized for their country. The “international recognition” portfolios had the 10 most recognized stocks from the foreign country.

The results obtained by Borges et al. (1999) in the six-month period after the survey show that the “domestic recognition” portfolio outperformed the other benchmarks by a large
margin only for German laypeople and experts. In the USA, the “domestic recognition” portfolio performed below the market index and the mutual fund industry. However, the “international recognition” portfolio obtained quite impressive results. For instance, American laypeople recognition’s portfolio beat the market by 23 per cent. The aggregate results were very positive for the recognition heuristic as it had beaten the market in six out of eight tests, often by a large margin.

Borges et al. (1999) present some reasons why the recognition heuristic performed so well in the stock market. First, following the findings of Buzzell et al. (1975) and Ramanujam and Venkatraman (1984), evidence of a positive correlation was found between market share and profitability. One more reason for good performance of the recognition heuristic is the link between above-average profitability and core competence. Finally, a company name has value and it is important information for investors. The above-average returns presented by Borges et al. (1999) may also be a result of the extremely bull market during the period of the study, as well-known firms normally do well in up markets.

The call for further investigation under different market conditions was fulfilled by Boyd (2001). This author attempted to replicate the same experiment as Borges et al. (1999) in a bear market to test whether the recognition heuristic still produces good results with this condition. The method used was the same, surveying a group of students at a US business school and another group in non-business courses, with a total of 184 participants. A list of 111 stocks randomly extracted from the S&P500 was given to them to infer the most recognized stocks.

From the participant responses, a single high-recognition test portfolio was constructed for both groups (business and non-business students), using the 23 stocks recognized by more than 90 per cent of the participants. During the following six-month period, the market portfolio lost 4.54 per cent and the highly recognized stocks portfolio registered a loss of 14.75 per cent. Out of curiosity, an additional test was also performed. A portfolio was built containing the 20 least recognized companies by the combined participant groups. The results were quite surprising. This portfolio yielded a gain of 16.27 per cent during the same six-month period. According to Boyd (2001, p. 155), “a high degree of company name recognition can lead to disappointing investment results in a down market, and it can also be beat by pure ignorance”.

A similar study was performed by Andersson and Rakow (2007) attempting to replicate the findings of Borges et al. (1999). Therefore, they performed four different surveys. In the first, 53 UK psychology students provided recognition data for the 30 companies listed on the Italian MIB30 stock index. The second study surveyed 52 UK psychology students and 15 Swedish business students about recognition of UK, Swedish and Italian stocks. The authors extracted a list of 15 companies from each market index (UK FTSE 100, Swedish Stockholmbörsen and Italian MIB30). The shares selected were those with the highest volume for each stock index. In the third study, 70 UK psychology students, 78 Austrian business students and 36 Swedish business students provided recognition data for Austrian, Swedish and German stocks. A list of 48 stocks was on the survey, of which 9, 16 and 23 were randomly extracted respectively from the Austrian prime list, the Swedish A-List and the German prime standard. Finally, in the fourth study 15 Swedish business students provided recognition data for UK, Swedish and Italian stocks. Here, the stocks under analysis were the same 45 as in the second study, excepting one that had meanwhile ceased to trade.

Contrary to Borges et al. (1999), Andersson and Rakow (2007, p. 36) failed to achieve the same results, concluding that:
the search for a quadratic relationship whereby intermediate levels of recognition might yield better (or worse) returns than both low and high levels of recognition also failed to show a consistent or predictable pattern.

Therefore, “ignorance” has no special advantage or disadvantage over sophisticated knowledge. Also, in contrast with the findings of Borges et al. (1999), the recognition heuristic tended to perform better in falling markets and poorly in rising ones.

One can then observe that although several studies have concluded that individuals tend to use heuristics in an adaptive way (Payne et al., 1993; Katsikopoulos and Martignon, 2006), that is, to best exploit the features of the environment in which the decision takes place, there is still no consensus on the usefulness of the recognition heuristic in the field of portfolio management.

3. Methodology

The study of the impact of recognition heuristic in stock market returns first requires that the recognized stocks are identified apart from the unrecognized stocks. In this study, two different approaches were used.

As in Borges et al. (1999), Boyd (2001) and Andersson and Rakow (2007), a survey was performed to infer which stocks are the most recognized from the STOXX® Europe 50 index, which is composed of 50 leading blue-chip firms in the European region. To complement this paper, an additional methodology was adopted. Google Trends was used to access keyword internet search volume variation across time as a proxy for investor recognition. Subsequently, two investment strategies were designed accordingly to the recognition heuristic principles and their profitability were compared to the market return. In other words, it was expected that the most recognized companies would present higher investor attention on the web than the less recognized companies.

3.1 Survey

Aligned with the methodology followed by Borges et al. (1999), Boyd (2001) and Andersson and Rakow (2007), our survey had the following structure: the first two questions merely had the objective of collecting information about the participants’ nationality and age bracket. Those were followed by three questions that identified the participant’s level of expertise in financial markets. Here, the participant had to describe his level of education and whether he works in the field of business/finance or not. Additionally, he was requested to answer the frequency of investments made in financial markets (such as stocks, mutual funds and futures). Closing this group of questions, the participant had to describe how often he read/watched financial news. The last question aimed to discover which stocks are most well-known from the list presented. The participant was presented with a list of the companies composing the STOXX® Europe 50 Index, from which he was asked to identify the names recognized. The company names on the list were replicated from Thomson Reuters Datastream to avoid arbitrariness and ensure that participants are presented with a standardized name selection process.

The survey was presented to participants through Google Forms and it was available in two languages: Portuguese and English. The participant had the option to choose the most suitable version. To distribute the survey in a more effective and faster method, it was decided that the webpage links for the survey should be provided through social networks, such as Facebook and LinkedIn.

As in Borges et al. (1999) and Boyd (2001), a portfolio of the stocks recognized by more than 90 per cent of the participants was constructed. Additionally, a portfolio was also constructed of the stocks whose company names were recognized by less than 10 per cent of
the participants. The compilation of the portfolios obeyed the equally weighted rule, where each company contributes equally for the portfolio’s performance. These two portfolios were then measured against the market portfolio to compare the performance of both strategies.

To avoid very similar returns to the market portfolio due to composition, the individuals who recognized more than 90 per cent of the companies, i.e. more than 45 companies were removed from this analysis. This kind of approach made it possible to analyse the return obtained per participant under the recognition heuristic principle, excluding those that knowing perfectly well the universe of stocks do not resort to the heuristic, and aggregate the results per participant’s degree of expertise.

Each portfolio was valued following the equally weighted rule, so each stock may have exactly the same preponderance over the recognized portfolio. The survey was implemented in December 2014, and the portfolio was built using the Thomson Reuters Datastream opening price on 5 January 2015. The holding period was for five months, and the closing price on 5 June was chosen for liquidating the portfolios.

The return of each portfolio was compared with the STOXX® Europe 50 return and evidence of correlation between excess of return per each degree of expertise will be searched for.

3.2 Google Trends as a proxy for investor recognition
Given that Google search volume adequately proxies for investor attention and assuming that financial markets are characterized by incomplete information, a negative and persistent interdependence between changes in search volume and future returns would be expected (Fang and Peress, 2009). Barber and Odean (2008) defend that investors are able to choose from a large set of stocks when they want to buy; nevertheless, they only have a limited choice when selling securities. Subsequently, the increment of stock attraction should affect the buying side more than selling, mostly by particular and uninformed investors. Da et al. (2011) also measured attention using Google search volume and empirically observed that positive changes in the number of internet queries push up prices temporarily.

Measuring investor recognition is not a simple task. For instance, Fang and Peress (2009) measured the number of times that the company name appears in the newspaper as a proxy, but:

[...] there is no reliable information as to the extent to which readers of a newspaper pay attention to the mention of a company in its pages. Other measures of investor attention, such as analyst coverage, institutional holdings, or advertisement expenditures, suffer from similar shortcomings (Fang and Peress, 2009, p. 240).

Nowadays, the number of search queries as an indicator of people interest has great appeal. The internet is spread across the globe and practically every investor is able to access company information on it. Search volume seems appropriate, as an internet user will only actively “Google” a specific keyword if he or she is interested in the object underlying the search term.

To obtain the search volume for each company, Da et al. (2011) used the company ticker symbol. Bank et al. (2011) opted to use the ordinary firm names, as they believed that this method captures the extent of attention the firm is receiving from a much broader, and potentially relevant, audience. The average internet user is expected to search for a firm on Google by its company name and it is not likely to use the international securities identification numbers (ISIN), German securities identification code (WKN) or other technical stock symbols.
Bank et al. (2011) used Google Trends to access the search volume of firm names as a proxy for investor attention and study the implications for trading activity, liquidity and returns for German stocks. They concluded that:

[...] search volume is indeed a powerful measure of investor recognition. In particular, an increase in Internet search volume is related to higher trading activity, improved stock liquidity, and leads to higher future returns in the short-run (Bank et al., 2011, p. 240).

In this study, we used the same approach as Bank et al. (2011), where common company names functioned as a proxy to access firm’s recognition level. The purpose of the analysis was to infer whether increments in Google searches may lead to higher returns for the related stock in the following month. Furthermore, Google Trends has the option to specify the environment for each keyword to be used. For instance, if we insert ALLIANZ in the search tool, we have the option to specify the search volume for searches related to the financial services company. This option was used to empower the effectiveness of the search, to select the searches that concern the company name and reject the searches that may be related to other topics.

As Google is the most used search engine worldwide, the choice of Google Trends was obvious to proceed with our study. The only downside is that the search volume of a specific keyword is not given in absolute terms, but as a value relative to the total number of searches on Google during a given time interval. Therefore, for each keyword analysed this relative value is normalized to the interval between 0 and 100, where 100 represent the period in which the search volume was the highest in the time interval under analysis and 0 is obtained when the search volume does not reach a designated search volume threshold (Bank et al., 2011). These data transformation performed by Google inhibits us from comparing absolute search volume between keywords; nevertheless, we still can individually infer the behaviour of each company’s popularity across time.

Each stock compiling the STOXX® All Europe 50 was accessed for its search index value given by Google Trends and the time interval for the analysis was from January 2004 to April 2015. The time interval was chosen based on the data availability for Google Trends, as January 2004 was the starting point for Google registering of search volume. Also, having slightly more than 10 years of data allows measuring the correlation between increases in stock returns with previous increments of company popularity. To perform this analysis monthly data was used.

Furthermore, as in Bank et al. (2011), and to avoid portfolio distortions, this study only included companies where the search volume is provided for more than five months. From these, all the companies where the search volume equals zero for two or more consecutive months were excluded. Following this approach, only the data related to Anheuser-Busch Inbev, Lloyds Banking Group and Glencore PLC were left out the study. Also, following the methodology adopted by Bank et al. (2011), the monthly data collected in Google Trends was sorted into three quantiles of equal size each month accordingly to the change in search volume. From there, three different portfolios were constructed every month for the following month’s investing: one comprised 33 per cent of companies with highest increase in search volume, another, 33 per cent of companies with highest decrease in search volume and the final portfolio was made up of 33 per cent of companies with smallest variation in search volume. The return of each portfolio was computed as the average return for the stocks held by the portfolio in the following month. Thereafter, the time series of portfolio returns of the month after the portfolio formation was regressed on recognized risk factors by using three different market models: the CAPM model, the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model.
To complete this analysis, some investment strategies were tested using the previously constructed quantile portfolios. Therefore, to test the profitability of strategies relying on the recognition heuristic philosophy the portfolio with the highest increment in search volume was bought, as this variable is intended to function as a proxy of investor recognition. Additionally, a more aggressive strategy was used, where the portfolio with the highest increment in search volume was also bought, and it was shorted in the portfolio from which the search volume most decreased (zero-investment strategy).

As the investor will receive the return of the following month, the first two months of data are necessary to compute the change in Google Trends variable, so the period where returns were analysed spans from March 2004 to April 2015.

4. Analysis of results

4.1 Survey

The survey was performed during December 2014 and intended to infer which stocks from the STOXX® Europe 50 Index were most recognized by the participants. During this period, answers were collected from 272 participants. Most of the participants were Portuguese (91.55 per cent), followed by Vietnamese (2.94 per cent) and Indian (1.10 per cent), reflecting that most of them were from the University of Porto. More than half of the participants were aged between 18 and 25 years and slightly more than 96 per cent were aged 40 years or less.

Regarding the company names identified by each individual, on average each participant identified a total of 21 companies. Additionally, only 3.31 per cent of the participants were able to recognize 40 or more company names, while 8.82 per cent recognized less than 10 companies (Table I).

As mentioned in the previous section, the companies recognized by more than 90 per cent of the participants were chosen to be part of the highly recognized portfolio. On the other hand, the company names recognized by less than 10 per cent were selected for the unrecognized portfolio. In Table II, we can observe the composition of both portfolios built on 5 January 2015, which were liquidated on 5 June, after holding them for five months without performing any reallocation.

Before analysing the returns provided by each portfolio, it is important to mention that all the rates of return presented below were calculated excluding the transaction costs, that is, all the costs associated with building, maintaining and liquidating the portfolios.

Figure 1 presents the cumulative average returns for the three portfolios under analysis: the highly recognized, unrecognized and the market portfolios, which are represented here by the performance of the STOXX® Europe 50 Index. At a glance, it is possible to verify

<table>
<thead>
<tr>
<th>No. of companies identified</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>8.82</td>
</tr>
<tr>
<td>10-19</td>
<td>37.13</td>
</tr>
<tr>
<td>20-29</td>
<td>35.29</td>
</tr>
<tr>
<td>30-39</td>
<td>15.44</td>
</tr>
<tr>
<td>40-50</td>
<td>3.31</td>
</tr>
</tbody>
</table>

Survey by authors

Table I. Number of company names identified
that the market portfolio yielded the greatest return, 14.7 per cent from January until June. The least profitable portfolio was the unrecognized portfolio, with a return of 8.44 per cent, slightly below the highly recognized portfolio (9.3 per cent).

Nonetheless, the risk factors inherent to each investment strategy should also be discussed. In other words, the risk that investors incur when they are exposed to the different investment strategies must be accessed.
According to Table III, the daily standard deviation for the highly recognized portfolio (0.99 per cent) and for the unrecognized portfolio (0.93 per cent) is very similar to the market standard deviation (0.95 per cent). Furthermore, by analysing the portfolio Betas, it is possible to conclude that both the highly recognized portfolio and the unrecognized portfolio succeed well in replicating the market price movements, presenting a Beta equal to 1.05 and 1.01, respectively.

Therefore, it is possible to infer that all the three portfolios present an almost equal level of risk and, in consequence, the level of return provided by each portfolio really differentiates that the market portfolio is, by far, the most profitable portfolio.

In a nutshell, during the period considered for this analysis, the best strategy was to hold the market portfolio, although the highly recognized portfolio still yielded better returns than the unrecognized portfolio.

The results obtained here contrast with Borges et al. (1999), who also experienced an extremely bull market and the recognition heuristic portfolio yielded better returns than the market portfolio. Our results fit the findings of Andersson and Rakow (2007), who concluded that the recognition heuristic has special advantage neither over sophisticated knowledge nor the market.

Recalling Pachur et al. (2011, p. 4) on collective vs individual recognition problems, we adopt a different approach from previous studies and infer whether a participant would yield better returns by investing in companies he recognizes and the level of “ignorance” he possesses. Therefore, for each participant in this survey a portfolio was constructed of the stocks that the participant recognized. The portfolio return was also computed using the holding period from 5 January 2015 until 5 June 2015 and the portfolio was equally weighted for each stock.

The main goal was to see whether investors with less knowledge in financial markets (who identified fewer companies) would yield better returns than investors who have a broader knowledge in this field (identifying most of the companies). Moreover, each participant was ranked according to their stock market experience. To access the experience of each participant we took the data obtained for education level, frequency that the participant read financial news and frequency that they invest in the financial markets.

Nonetheless, the information collected is categorical, so it is necessary to transform it into a numerical format to be able to infer if more experienced participants yield less or more returns that less experienced ones. To do that, an experience rank was created which attributed points for the answers for each question to rank the participant. The overall experience level was obtained by summing the experience points obtained for each of the three questions.

At this stage, it is possible to infer whether the portfolio return (r) depends on the number of companies identified (CI) and the experience rank (ER) for each investor, using the following equation:

\[ r = \alpha + \beta_1 \cdot CI + \beta_2 \cdot ER \]

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Cumulative average return (%)</th>
<th>Daily average return (%)</th>
<th>Daily SD (%)</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly recognized</td>
<td>9.29</td>
<td>0.09</td>
<td>0.99</td>
<td>1.05</td>
</tr>
<tr>
<td>Unrecognized</td>
<td>8.44</td>
<td>0.08</td>
<td>0.93</td>
<td>1.01</td>
</tr>
<tr>
<td>Market</td>
<td>14.74</td>
<td>0.13</td>
<td>0.95</td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Notes:** The portfolio Beta was calculated as the average Beta for each stock composing the portfolio; Data were collected from Thomson Reuters Datastream. By the authors
The results of the estimation of equation (1) are presented in Table IV.

The $R^2$ for this model is 0.222132, which means that approximately 22.2 per cent of the model variability can be explained by the variables included in this analysis. Moreover, the model is statistically significant with an $F$-statistic of 38.40854, which represents a $p$-value of 0.000.

Individually, the companies identified variable is statistically relevant for this model for a significance level lower than 1 per cent. Nonetheless, the relationship between this variable is positive with the portfolio return. In fact, for each additional stock identified the investor is expected to gain an additional 0.0892 per cent return. This finding is contrary to the “less is more” feature of the recognition heuristic.

Regarding the experience rank the effect that it produces in the portfolio return is expected in recognition heuristic philosophy, which dictates that less experienced investors will yield higher returns. In fact, each additional experience point earned decreases the portfolio return by 0.0222 per cent.

4.2 Google Trends as a proxy for investor’s recognition

The search volume functions as a proxy for investor recognition; thus, increments of this variable should also denote higher company recognition. Consequently, two investment strategies were used to test whether by relying on the recognition heuristic principles it was possible to yield abnormal returns in the European stock market.

In Figure 2, we observe the performance of a 100€ investment from February 2004 until April 2015 in three different strategies: investing in the Market portfolio, investing in Panel A – which represents the strategy of buying those stocks that had the most increase in search volume each month – and investing in Panel B, which is an extension of the previous panel by also shorting the stocks where the search volume decreased the most. From Figure 2, it is possible to infer that the market strategy was the most profitable during the entire period under analysis.

Panel A, which is the conservative strategy adopted following the recognition heuristic principles, was the second most profitable strategy. Additionally, it can be graphically observed that this strategy managed to replicate the market with less volatility.

The performance of the most aggressive strategy employed, Panel B, was mostly flat during the entire period. In fact, a 100€ investment in this strategy on February 2004 would only be worth 102€ in August 2015, more than 10 years later. The main reason for this performance is that both portfolios contained in this investment performed very similarly during the entire period, where the gains of the portfolio held were cancelled by shorting the other portfolio.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Coefficient/value</th>
<th>Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.090796***</td>
<td>0.002166</td>
</tr>
<tr>
<td>Companies identified</td>
<td>0.000892***</td>
<td>0.000111</td>
</tr>
<tr>
<td>Experience rank</td>
<td>−0.000222*</td>
<td>0.000134</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.222132</td>
<td></td>
</tr>
<tr>
<td>$F$-statistic</td>
<td>38.40854***</td>
<td></td>
</tr>
</tbody>
</table>

Notes: ***Significant level at 1% level; **significant at 5% level; *significant at 10% level

From authors
To depict the risk-adjusted performance, these strategies were regressed with the CAPM model, the three-factor model from Fama and French (1993) and the Carhart (1997) four-factor model. The use of Jensen’s $\alpha$ helps to determine whether an investment strategy is earning the proper return for its level of risk, ultimately indicating whether it beat the market.

In Table V, we can observe the regressed coefficients for each strategy in the described market models.

From Panel A, which represents the investment strategy that follows the recognition heuristic principles in a conservative approach – buying the portfolio with greatest increment in search volume, it is possible to observe that the Jensen’s $\alpha$ measures are positive in the three models, showing that that strategy was able to beat the market during the period under analysis.

Nevertheless, in the three models the variable is statistically insignificant for every significant level equal to or lower than 10 per cent. Therefore, the Jensen’s $\alpha$ is not statistically different from 0. As a consequence, Jensen’s $\alpha$ measures are not positive enough to infer that the recognition heuristic may lead to greater returns in the European stock market.

The investment strategy $\beta$ for the CAPM model is 0.187, which means that the investment strategy followed in Panel A is a lot less risky than the market. Therefore, any attempt to solely compare the average returns of this strategy on a market index without explicit adjustment for differential riskiness would be highly biased against the funds.

Regarding Panel B, this represents a more aggressive variant of the recognition heuristic principles, buying the stocks that had the most search volume increase in the previous month and shorting the stocks where the search volume most decreased, the Jensen’s $\alpha$ are negative for the CAPM and the FF three-factor model and 0.000 for the C four-factor model. Nevertheless, all three Jensen’s $\alpha$’s are also statistically insignificant with significance levels equal or lower than 10 per cent. Therefore, these $\alpha$s are not statistically different from 0.
which means that the Panel B strategy is not capable of beating the market consistently, considering a confidence level of 90 per cent. During the period under analysis, a rising market was experienced, where strategies relying on recognition heuristic philosophy should yield better returns for their investors (Borges et al., 1999; Boyd, 2001). Nevertheless, as in Borges et al. (1999), the results obtained here provide weak signs that investment strategies based on the recognition heuristic may yield abnormal returns. Additionally, it is necessary to assume that no transaction costs were accounted for in this study. In fact, the investment strategy presented here requires portfolio adjustments on a monthly basis to keep the most searched-for companies in the portfolio. Therefore, given the results obtained, it would be wise to assume that a passive investment strategy would be more profitable than following the investment strategy proposed earlier.

5. Conclusions
The main objective of this paper is to study the performance of the recognition heuristic in the financial markets and to contribute to the knowledge in this field. Although many authors have already studied this heuristic when applied to financial markets there is a lack of consensus in the literature. The three main papers from the authors referred to were mainly applied to the US and German markets, apart from Andersson and Rakow (2007) who extended their analysis to a few other European economies. In this sense, it was valuable to study the recognition heuristic in the European market as a whole to infer the profitability of investment strategies related to this heuristic. To proceed with this study, two different approaches were undertaken.

### Table V.
Trading profits related to Google search volume

<table>
<thead>
<tr>
<th>Estimation</th>
<th>CAPM</th>
<th>FF three-factor</th>
<th>C four-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Buy the portfolio with highest increment in search volume</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (Jensen’s $\alpha$)</td>
<td>0.002 (0.004)</td>
<td>0.002 (0.004)</td>
<td>0.003 (0.004)</td>
</tr>
<tr>
<td>$R_{mf}$ - $R_f$</td>
<td>0.187** (0.077)</td>
<td>0.0154* (0.090)</td>
<td>0.128 (0.091)</td>
</tr>
<tr>
<td>SMB</td>
<td>–</td>
<td>0.930*** (0.224)</td>
<td>0.915*** (0.223)</td>
</tr>
<tr>
<td>HML</td>
<td>–</td>
<td>0.125 (0.233)</td>
<td>0.005 (0.245)</td>
</tr>
<tr>
<td>WML</td>
<td>–</td>
<td>–</td>
<td>–0.187 (0.124)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.042</td>
<td>0.155</td>
<td>0.170</td>
</tr>
<tr>
<td>F-statistic</td>
<td>5.832**</td>
<td>7.965***</td>
<td>6.606***</td>
</tr>
<tr>
<td><strong>Panel B: Buy the portfolio with highest increment in search volume and sell the portfolio from which the search volume most decreased</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (Jensen’s $\alpha$)</td>
<td>–0.001 (0.001)</td>
<td>–0.001 (0.001)</td>
<td>0.000 (0.001)</td>
</tr>
<tr>
<td>$R_{mf}$ - $R_f$</td>
<td>0.055*** (0.019)</td>
<td>0.048** (0.023)</td>
<td>0.037 (0.023)</td>
</tr>
<tr>
<td>SMB</td>
<td>–</td>
<td>0.031 (0.058)</td>
<td>–0.024 (0.057)</td>
</tr>
<tr>
<td>HML</td>
<td>–</td>
<td>0.033 (0.061)</td>
<td>–0.020 (0.063)</td>
</tr>
<tr>
<td>WML</td>
<td>–</td>
<td>–</td>
<td>–0.082** (0.0316)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.061</td>
<td>0.065</td>
<td>0.112</td>
</tr>
<tr>
<td>F-statistic</td>
<td>8.611***</td>
<td>3.020***</td>
<td>4.057***</td>
</tr>
</tbody>
</table>

**Notes:** This table depicts the profitability of trading strategies described in Panels A and B; standard errors are provided in parentheses; number of observations: 134; ***significant level at 1% level; **significant at 5% level; *significant at 10% level.

**Sources:** By the authors; e-views 8
The first method replicated the methodology adopted from previous studies, performing a survey to understand which companies were the most recognized by the participants. Subsequently, two portfolios were constructed, one compiled of the highly recognized companies and other of the less recognized companies. The returns were then compared with the market.

The second method was more innovative and designed to take advantage of new sources of data available, to study whether the fast and frugal recognition heuristic may also be applied to financial markets. Taking advantage of Google Trends, monthly internet search volume data were collected, and statistical software was used to infer the impact of changes in search volume on future stock returns. To do that, three equal size portfolios were constructed each month: one with the companies that mostly increased in search volume, another with the companies that mostly decreased in search volume and the last with the companies that verified small changes in search volume. Then, two investment strategies were developed based on the recognition heuristic principles, and the returns for those strategies were regressed using the most relevant market models: the CAPM model, the Fama and French three-factor model and the Carhart four-factor model. Jensen’s alpha was estimated to infer whether the designed investment strategies could beat the market on a consistent basis.

From the first method, it was possible to conclude that the market portfolio performed much better than the recognized portfolio during the observation period (yielding 14.7 against 9.29 per cent), which in turn beat the unrecognized portfolio (8.44 per cent) by a tiny margin. It is important to note that all three portfolios presented similar levels of risk, measured by the daily standard deviation and the portfolio beta. This finding was not expected by the previous studies that claim that recognition heuristic strategies yield greater returns during bullish periods (Borges et al., 1999). Moreover, we checked the “individual recognition” where several portfolios were constructed, one for each participant with the companies identified. It was found that the most successful participants were those who recognized more companies, contradicting the “less is more” effect of the recognition heuristic.

Regarding the Google Trends study, the results indicated that the strategy based on the recognition heuristic principles yielded weak but statistically insignificant abnormal returns on a consistent basis. Nevertheless, the investment strategy would imply having to modify the portfolio on a monthly basis, which would lead to high transaction costs that could absorb the strategy profitability. Therefore, it is possible to conclude that following the investment strategy based on recognition heuristic principles would not produce better returns to investors than investing in the market portfolio.

Through the exhaustive analysis performed here on the recognition heuristic in the European stock market, it is possible to conclude that no evidence was found for the viability of exploring this type of strategy. In fact, the investors would always gain better returns when adopting a passive investment strategy.

Therefore, it would be wise to assume that the European market presents at least a degree of efficiency where no investment would yield abnormal returns following the recognition heuristic.

Despite the results obtained, they are useful to understanding the performance of recognition heuristic strategies over a comprehensive time horizon, and it would be interesting to depict its viability during different market conditions. This analysis could provide additional information about a preferable scenario for employing our strategies and, ultimately, enhance the profitability of recognition heuristic strategies.
References


Corresponding author
Luis Pacheco can be contacted at: luisp@upt.pt
The valuation performance of mathematically-optimised, equity-based composite multiples

Soon Nel
Department of Accountancy, Stellenbosch University, Stellenbosch, South Africa, and

Niël le Roux
Department of Statistics and Actuarial Science, Stellenbosch University, Matieland, South Africa

Abstract
Purpose – This paper aims to examine the valuation precision of composite models in each of six key industries in South Africa. The objective is to ascertain whether equity-based composite multiples models produce more accurate equity valuations than optimal equity-based, single-factor multiples models.

Design/methodology/approach – This study applied principal component regression and various mathematical optimisation methods to test the valuation precision of equity-based composite multiples models vis-à-vis equity-based, single-factor multiples models.

Findings – The findings confirmed that equity-based composite multiples models consistently produced valuations that were substantially more accurate than those of single-factor multiples models for the period between 2001 and 2010. The research results indicated that composite models produced up to 67 per cent more accurate valuations than single-factor multiples models for the period between 2001 and 2010, which represents a substantial gain in valuation precision.

Research implications – The evidence, therefore, suggests that equity-based composite modelling may offer substantial gains in valuation precision over single-factor multiples modelling.

Practical implications – In light of the fact that analysts’ reports typically contain various different multiples, it seems prudent to consider the inclusion of composite models as a more accurate alternative.

Originality/value – This study adds to the existing body of knowledge on the multiples-based approach to equity valuations by presenting composite modelling as a more accurate alternative to the conventional single-factor, multiples-based modelling approach.

Keywords Emerging markets, Composite multiples, Equity multiples, Equity valuations, Valuation precision

Paper type Research paper

1. Introduction
This paper examines the valuation precision of composite models in each of six key industries in South Africa. The objective is to ascertain whether equity-based composite
multiples models produce more accurate equity valuations than optimal equity-based, single-factor multiples models. The analysis will be conducted on an industry basis, as it is anticipated that different composite multiples models will be best suited to different industries (Abukari et al., 2000; Barker, 1999; Fernández, 2001; Goedhart et al., 2005; Liu et al., 2002a; Nel, 2009a; 2009b, 2013b; Schreiner, 2007). Optimal equity-based composite multiples models will be constructed for each of the six South African industries, and their valuation precision will be compared to that of eight optimal equity-based, single-factor multiples models. The aim is to establish whether industry-specific, equity-based, composite multiples models offer higher degrees of valuation precision vis-à-vis industry-specific, equity-based, single-factor multiples models.

First, the proper composition of the composite models requires investigation. To this end, one has to determine the optimal weight allocations of each of the components of the composite models. This is achieved by using mathematical optimisation algorithms with the goal of minimising the sum of the absolute valuation errors (SAVE), the median valuation errors (MVE) and the sum of the squared valuation errors (SSVE). Second, the increase in valuation precision that composite multiples models may offer over single-factor multiples models is estimated. Third, the consistency of the results is assessed for the period 2001–2010.

Multiples are used extensively in practice, which is why analyst reports are typically inundated with various different single-factor multiples (Asquith et al., 2005; Damodaran, 2009, 2006b; Efthimios et al., 2004; Fernández, 2002; PricewaterhouseCoopers (PwC), 2015, 2012; Roosenboom, 2007). Therefore, there seems to be a case for compiling a composite of these single-factor multiples.

However, multi-factor modelling is not a new phenomenon in financial literature. Ross (1976), for example, presents evidence that a two-factor arbitrage pricing theory model explains asset prices better than the traditional capital asset pricing model. Similarly, Fama and French (1996) document evidence in support of a three-factor capital asset pricing model that encapsulates many of the anomalies that are not explained by the traditional single-factor capital asset pricing model. Although a multi-factor approach may not seem new in the field of finance, it is a novel application in respect of multiples-based valuations. International literature offers very little guidance in this regard, and the evidence from emerging markets, in particular, is limited in scope and seems rather lacklustre (Nel et al., 2014b). It is hoped that the findings from this paper will offer a new perspective for the composition of composite multiples models in emerging markets and in South Africa, in particular.

2. Literature review
Most of the existing international literature focuses on a composite of market price (P) to earnings per share (EPS) and book value of equity (BVE) per share. The use of a composite of P/EPS and P/BVE stems from the multitude of researchers who have attempted to investigate the nature of the relationship between accounting data and company value by focusing on these two multiples (Ohlson, 1995; Ohlson and Juettner-Nauroth, 2005; Penman, 1998). Cheng and McNamara (2000) compared the P/EPS, P/BVE and an equally weighted combination of P/EPS and P/BVE over a period of 20 years from 1973 to 1992 by extracting data from the Industrial Compustat database. Cheng and McNamara (2000) found that a combination of P/EPS and P/BVE outperforms the individual P/EPS and P/BVE multiples. In a similar study conducted in the USA and Europe, Schreiner (2007) tested the valuation precision of a two-factor composite model consisting of P/BVE and other earning-based multiples. He found that a significant valuation performance improvement occurred when opting for a two-factor valuation model vis-à-vis a single-factor valuation model.
Chan (2009) also investigated a two-factor composite model, consisting of P/EPS and P/BVE, for US-based companies for the period 1982-2004 but, contrary to previous studies, allowed the weighting for these multiples to vary. Besides the fact that Chan’s findings concurred with previous research, they also suggested that a composite multiple with unrestricted weightings increased the valuation precision over an equally weighted composite multiple. In a similar study, Henschke and Homburg (2009) compared an equally weighted composite model of P/BVE, P/EPS (trailing) and P/EPS (forecast), for companies in the USA for the period 1986-2004, and found that the composite models outperformed individual multiples.

Penman (1998) tested composite multiples for American companies based on EPS, book value and price data obtained from the Compustat database for the 25-year period from 1968 to 1993. Penman based the weightings on the relative difference between earnings and book value, which varied over time. In keeping with Chan’s (2009) results, Penman suggested that the weightings should be adjusted according to the spread between earnings and book value over time, i.e. unrestricted weightings increase the valuation precision.

Extracting data from the Compustat and Institutional Brokers Estimation System databases for the period 1981 to 1999, Yoo (2006) tested the valuation precision of a composite of earnings, book value, earnings before interest, tax, depreciation and amortisation (EBITDA) and revenue multiples compared to the respective individual multiples. The results indicated that the composite model offered an increase in valuation precision over the use of individual multiples.

While almost all of the studies mentioned above limited the number of composite variables to two, even the most comprehensive of these studies failed, among other limitations, to include cash flow–value driver-based multiples in the composite multiple or to distinguish between equity- and company-based multiples. Regrettably, the matching principle is often neglected by analysts, which could result in substantial mispricing of the equity of companies with leveraged capital structures (Nel, 2014f). Other limitations of previous research include the use of restricted weightings, limited or non-industry specific analysis and the absence of non-linear weight allocations.

In this study, these limitations will be addressed by empirical testing, by means of linear modelling and/or non-linear weight allocations, of the valuation precision of composite models that combine information from various value driver categories, including cash flows. In addition, the focus of this study is on equity-based composites, in particular. The aim is to ascertain whether equity valuations based on unrestricted, industry-specific composite multiples outperform valuations based on industry-specific, single-factor multiples in terms of valuation precision.

The evidence from the developed market literature, therefore, suggests that composite modelling produces more accurate valuations than single-factor modelling. What does the emerging market literature reveal? The only documented study on composite modelling in emerging markets was conducted by Sehgal and Pandey (2010), who tested the valuation performance of two-factor composite models in Brazil, India, China, South Korea and South Africa, for the period 1993–2007. They concluded, among other findings, that two-factor composite models produce neither significantly nor consistently, more accurate valuations than single-factor, multiples models, which contradicts evidence from the developed market literature.

Unfortunately, the scope of the study by Sehgal and Pandey was limited. They selected only one value driver out of each of three value driver categories, namely, earnings (EPS), assets (BVE) and revenue (R), which may have biased their design (Nel et al., 2014b). Sehgal and Pandey also excluded the entire cash-flow- and dividend-based value driver categories,
seemingly as a result of data limitations, which may have obscured their results. In addition, Sehgal and Pandey included R as a value driver in an equity-based valuation analysis, which is conceptually flawed. The matching principle is often neglected by analysts and academic researchers alike, i.e. they fail to distinguish between equity- and company-based valuations (Nel et al., 2013b).

Regrettably, the limited scope of the study by Sehgal and Pandey prohibits a more detailed analysis. Consequently, this paper aims to broaden the scope of the South African case study, in particular, by including eight equity-based single-factor multiples, based on value drivers representing all of the major equity-based value driver categories, namely earnings, assets, dividends and cash flows.

3. Empirical design

3.1 Data

The composite models constitute equity-based compilations of the eight equity-based, single-factor multiples models, as contained in Table I. The equity-based focus of this paper stems, first, from the objective of this study, which is to investigate the valuation precision of equity-based composite multiples models, in particular and, second, from the finance literature that suggests that equity-based multiples outperform company-based multiples in terms of valuation precision (Nel et al., 2013b; Schreiner, 2007).

The data items were extracted from the McGregor BFA database, one of the leading data houses in South Africa, for the period 2001-2010 (PwC, 2015). Note that the matching principle is applied for the selection of the equity-based value drivers, i.e. the value drivers represent claims to equity holders in particular (Damodaran, 2009, 2006a; Nel et al., 2014e, 2013b; Schreiner, 2007). Although one may be tempted to incorporate company-based, single-factor multiples into the equity-based composite model, this will result in model inconsistencies, which may obscure the interpretation of the results. The number of observations varied for each equity-based multiple, depending on the specific industry in question. The population sizes per industry varied between 242 and 1,248 observations.

The focus in this paper is primarily on equity-based multiples and their behaviour in each of six key industries, namely basic materials, consumer goods, consumer services, financials, industrials and technology. As a result of data limitations – a common phenomenon in developing markets (Omran, 2003; Sehgal and Pandey, 2009) – a sector-based approach was not possible. Instead, an industry-based approach was adopted. Although ten industries are demarcated on the McGregor BFA database, insufficient data is

<table>
<thead>
<tr>
<th>Earnings</th>
<th>Value drivers</th>
<th>Dividends</th>
<th>Cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPV P</td>
<td>P</td>
<td>BVE</td>
<td>OD</td>
</tr>
<tr>
<td>PBT</td>
<td>PAT OD</td>
<td></td>
<td>NCIfIA</td>
</tr>
<tr>
<td>HE</td>
<td></td>
<td></td>
<td>FCFE</td>
</tr>
</tbody>
</table>

Notes: MPV – market price variable; P – market price; PBT – profit before tax; PAT – Profit after tax; HE – headline earnings; BVE – book value of equity; OD – ordinary dividends; NCIfOA – net cash inflow from operating activities; NCIfIA – net cash inflow from investment activities; FCFE – free cash flow to equity. Own elaboration
available for four of these industries, namely healthcare, oil and gas, telecommunications and utilities. Consequently, these four industries are omitted from the analysis, and the focus is on the six key industries, for which sufficient data is available.

3.2 Model specification

Multiples-based equity valuations assume that the actual equity value \( V_{it} \) of a company \( i \) at a given point in time \( t \) is equal to the product of a multiple \( \lambda_{it} \) and a specific value driver \( \alpha_{it} \) at that specific point in time, so that

\[
V_{it} = \lambda_{it} \cdot \alpha_{it}
\]  

(1)

Refer to Nel, Bruwer and Le Roux (2014a) for more details pertaining to single-factor multiples. In this paper, the market-based approach, as modelled in Equation (1), is adopted. To investigate the valuation precision of composite multiples models, Equation (1) is extended to accommodate composite modelling:

\[
\hat{V}_{it}^e = \sum_{j=1}^{k} \beta_{jt} \cdot \hat{\lambda}_{jpt} \cdot \alpha_{jit}
\]  

(2)

where \( \hat{V}_{it}^e \) is the predicted equity value of company \( i \) at time \( t \) and \( \hat{\lambda}_{jpt} \cdot \alpha_{jit} \) represents each single-factor equity value prediction \( j \) that is included in the composite multiples. The aim of the research is to establish the ability of valuations based on Equation (2) to approximate actual share values. Functions for the calculation of \( \hat{V}_{it}^e \) and the statistical analysis thereof were developed in the R-package, an open source programming language that lends itself to statistical analysis and graphics (R Core Team, 2015). The optimal number \( k \) of single-factor multiples models that is catered for in each composite model will depend on the optimal weightings \( (\beta_{jt}) \), as obtained from the optimisation applications. It is envisaged that these multiples will be drawn from various value driver categories, which may include earnings, assets, dividends and cash flows. A high level of multicollinearity was anticipated amongst the respective value drivers. Therefore, principal component analysis (PCA) was applied to transform the initial multi-variable data set into uncorrelated combinations (principal components) of the original independent variables, which nullified kappa readings (measure of multicollinearity) to insignificant numbers. All of the principal components were, therefore, independent of each other after transformation. However, there were assumption violations in our application pertaining to principal component regression (PCR), which constitutes a linear regression approach. Therefore, as a result of these violations, we adopted a direct constraint optimisation approach, aimed at optimising the median absolute valuation errors and not the sum (or mean) of the squared evaluation errors. The \( \beta \)-value refers to the corresponding weightings for each of the single-factor multiples, which will be determined by mathematical optimisation applications in the R-package. The assumptions regarding \( \beta \) are that \( 0 \leq \beta_{1t}, \beta_{2t}, \ldots, \beta_{kt}, \leq 1 \) and \( \sum_{j=1}^{k} \beta_{jt} = 1 \).

The composite multiples models’ predicted equity values will, therefore, encapsulate the weighted average of the predicted values of the respective single-factor multiples. Subtracting Equation (2) from the actual equity value \( V_{it}^e \) of a company \( i \) at a given point in time \( t \) produces the valuation error margin:
As the valuation error margin will be size-dependent, the standardised absolute deviation ($e_{it}$) is expressed proportionally to the actual equity value, $V_{it}$; therefore:

$$e_{it} = \left| \frac{\hat{V}_{it} - V_{it}^e}{V_{it}^e} \right|$$ (4)

The market-based approach that is adopted in this paper was introduced to the finance literature by Alford (1992) in a joint research effort between the Massachusetts Institute of Technology and corporate financiers from Ernst & Young. It has since been refined by various scholars (Berkman et al., 2000; Cheng and McNamara, 2000; Dittmann and Weiner, 2005; Gilson et al., 2000; Kaplan and Ruback, 1995; Liu et al., 2007, 2002a; 2002b; Minjina, 2008; Nissim, 2011). From the literature review, it is evident that the initial research conducted on the construction of composite multiples models focused on equally weighted models, which required no optimisation procedure. However, subsequent studies found that when these weightings were not restricted, i.e. when the single-factor multiples models were not allocated an equal weighting, the valuation precision of the composite multiples models increased vis-à-vis equally weighted composite multiples models. The objective of the resulting optimisation process in composite-based modelling is the minimisation of the valuation error, as per Equation (4).

Various methods were considered for determining the optimal weight allocations of the components of the composite models. Among the alternatives considered were R-based PCA, PCR and three mathematical optimisation applications, namely, lpSolve, Rsolnp, as well as Quadprog. Unfortunately, the nature of the data rendered some of these alternatives unsuitable for the purposes of this study. Consequently, the components of the composite models were weighted based on the three mathematical optimisation applications, namely, lpSolve, Rsolnp, as well as Quadprog.

3.3 Mathematical optimisation
As the objective of the optimisation process is to determine the optimal weightings that should be allocated to the single-factor multiples models contained in each composite model, the problem is essentially one of mathematical optimisation. However, given the nature of the minimisation objective of the optimisation function, there is no closed-form algebraic solution to the optimisation objective. Consequently, it was deemed prudent to use more than one optimisation method, namely, SAVE, MVE and SSVE. Two restrictions were imposed on all three methods. The first was that the weightings had to add up to one and the second was that all the weightings had to be positive.

The first application, lpSolve, optimises the weight allocations based on the objective of minimising the SAVE. The lp function, which is an integer programming application in the R-package lpSolve, was used to apply the SAVE method. The objective of the lp function was to produce optimal weightings to be allocated to each of the single-factor multiples models included in the composite multiples models, to minimise the SAVE. To this end, the R function SAVE was written to effect the optimisation of the objective function [Equation (5)]:

$$\hat{V}_{it} - V_{it}^e$$ (3) Equity-based composite multiples
\[
\min \mathbf{a} \sum_{i=1}^{n} \left( \frac{|y_i - \mathbf{m}_i \cdot \mathbf{a}|}{y_i} \right)
\]

subject to \[
\begin{align*}
\sum_{j=1}^{p} a_j &= 1 \\
 a_j &\geq 0 \text{ for all } j
\end{align*}
\]

where \(y_i\) is the \(i\)th actual equity value, while \(\mathbf{m}_i\) represents a vector of equity value estimates corresponding to \(y_i\) and \(\mathbf{a}\) denotes the weight allocation to each single-factor multiple. The vector \(\mathbf{a}\) is of size \(p\) – the number of single-factor multiples.

However, a key focus point in the international literature is the minimisation of the MVE (Schreiner, 2007). Consequently, an \textit{R} function, namely, \texttt{MinMed3}, which focuses on the minimisation of the MVE, was written to implement the following:

\[
\text{Let } d_i = \left( \frac{|y_i - \mathbf{m}_i \cdot \mathbf{a}|}{y_i} \right) \text{ for } i = 1, 2, \ldots, n
\]

The median of the values \((d_i)\), as defined in function [Equation (6)], is minimised by \texttt{MinMed3}.

The output of \texttt{MinMed3} contains the optimal weightings of the various single-factor multiples models contained in the composite multiples models. The MVE approach was affected via the \texttt{solnp} function, a non-linear optimisation function based on the Lagrange method, in the \texttt{Rsolnp} package.

The third application, namely, \texttt{Quadprog}, optimises the weight allocations, based on the objective of minimising the SSVE. However, the underlying principle of the SSVE approach is similar to that of linear regression, which academic researchers generally favour due to its simplicity and the ample software programmes available in support of it. Valuation theory, however, suggests that very few, if any, relationships among multiples are linear (Damodaran, 2006a; Yee, 2005). Therefore, despite the popularity thereof, the SSVE-based results were deemed less reliable.

Consequently, the \texttt{lpSolve} application, which optimises the weight allocations, based on the objective of minimising the SAVE, was used as the main mathematical optimisation tool. The second application, \texttt{Rsolnp}, which optimises the weight allocations based on the objective of minimising the MVE, was used to validate the results that were obtained from the \texttt{lpSolve} application. The latter results also afford one the opportunity to compare the results with those of studies which applied median-based valuation errors in the US and European markets.

As with any mathematical optimisation method, the \texttt{solnp} function in the \texttt{Rsolnp} package requires the specification of starting parameter vectors. The solution offered by \texttt{solnp}, or any other optimisation function, is dependent on these starting parameter vectors. When the starting parameter vectors are omitted, the \texttt{solnp} function assumes equally weighted starting parameter vectors by default. However, omitting the starting parameter vectors may potentially increase the risk of encountering local minimums.
3.4 Local minimums when optimising beta

The risk with local minimums is that the $\beta$-values offered by the optimisation applications may not be optimal, i.e. they could differ substantially from global minimums (Le Roux et al., 2014d). One method of addressing the risk of local minimums vis-à-vis global minimums is by altering the starting parameter vectors, i.e. by using various different (random) starting parameter vectors, and by repeating the optimisation process. The optimal solution set would be the one that produces the lowest valuation error, which, if repeated often enough, should be very close to the global minimum, or at least immaterially different from it. Intuitively, then, one could use the optimal output of a previous run of the same method or the optimal output of a different optimisation method as starting parameter vectors. The latter approach was adopted in this study. The optimised output, i.e. the weight allocations in the composite models that produced the most accurate valuations, from the SAVE method, was used as the set of starting parameter vectors for the MVE method.

Table II, for example, illustrates the results of the optimisation process for 2010. Note that all the single-factor multiples originally start with an equal weighting of 0.125 in SAVE, after which the optimal output of SAVE becomes the starting parameter vectors in

<table>
<thead>
<tr>
<th>Composites 2010</th>
<th>Value drivers</th>
<th>Cash flows</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Earnings</td>
<td>Assets</td>
</tr>
<tr>
<td></td>
<td>PBT</td>
<td>PAT</td>
</tr>
<tr>
<td>Basic materials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>0.0131</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>0.0026</td>
<td>–</td>
</tr>
<tr>
<td>Consumer goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Consumer services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Financials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Industrials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial SAVE-based weightings</td>
<td>0.1250</td>
<td>0.1250</td>
</tr>
<tr>
<td>Optimal SAVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Optimal MVE-based weightings</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Own elaboration

Table II. The optimisation process to determine the optimal weightings of the single-factor multiples models, as included in the composite multiples models of six key South African industries for 2010.
MinMed3. As is evident from Table II, the output from SAVE is optimised further via MinMed3 to eventually reach the optimal MVE-based weightings. A substantial improvement in the valuation precision of the new composite-based model vis-à-vis the original run/method would imply that one has moved substantially closer to the global minimum (Le Roux et al., 2014d).

Although it is impossible to determine conclusively whether the final solution constitutes the global minimum, the aim of this study is not to establish whether the valuation error is at the global minimum. The objective is merely to establish whether composite multiples models produce more accurate valuations vis-à-vis single-factor multiples models and, as the results in the next section will indicate, the latter was confirmed without the knowledge of the actual global minimum valuation errors.

4. Empirical results and discussion

The empirical analysis initially focuses on the correlation matrices of market capitalisation (MCap) and all eight equity-based value drivers for the period between 2001 and 2010. The focus then shifts to the correlation matrices of the eight equity-based value drivers over the market as a whole, as well as within the six key industries, including a discussion of the occurrence and mitigation of multicollinearity. This is followed by a framework for composite multiples models for each of the six key industries in South Africa. The valuation performance of these composite models is then compared to that of the single-factor multiples models, as contained in Table I, to determine the magnitude of the increase in valuation precision, if any. Lastly, the consistency of the results is investigated for the 10-year period between 2001 and 2010 and compared to evidence from the developed market literature and the only other emerging market study of this kind.

4.1 Consistency of the market price variable and value drivers over time

An analysis of the observed relationships between MCaps for the period 2001–2010 is contained in Table III. All the MCaps were positively correlated, and very strongly so, with correlation coefficients ranging between 0.8472 and 0.9813. Therefore, a high MCap in any particular year for the period 2001-2010 is likely to be accompanied by a high MCap in the other nine years as well.

A similar conclusion can be drawn from the value drivers contained in Table III, i.e. all the observed relationships were positive, and, with the exception of OD, net cash inflow from investment activities (NCIfIA) and free cash flow to equity (FCFE), these relationships were very strong, with correlation coefficients ranging between 0.7409 and 0.9699. Even among the three value drivers mentioned above, only a few pairwise combinations of years exhibit a relatively poor correlation coefficient compared to the other value drivers.

The OD-based correlation coefficients are all positively and highly correlated, with the exception of the pair-wise combination of years 2009 and 2001, where it is 0.6861, which, aside from being the only reading below 0.70, is still relatively high. Similarly, the FCFE-based correlation coefficients are all positively and highly correlated, with the exception of the pairwise combination of years 2008 and 2003, where it is 0.6734 – the only reading below 0.70 – but is still relatively high. The NCIfIA-based correlation matrix, however, contains five correlation coefficients below 0.70, ranging between 0.5826 and 0.6840. They are the pair-wise combination of 2001 with 2009 and 2010, and the pairwise combination of 2004 with 2007, 2008 and 2009.

Therefore, barring these few exceptions, one can deduce that a high estimate of MCap based on these value drivers in any particular year for the period 2001 to 2010 is likely to
<table>
<thead>
<tr>
<th>Year</th>
<th>MCap</th>
<th>PBT</th>
<th>PAT</th>
<th>HE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>2009</td>
<td>0.9758</td>
<td>0.9535</td>
<td>0.9384</td>
<td>0.9213</td>
</tr>
<tr>
<td>2008</td>
<td>0.9548</td>
<td>0.9200</td>
<td>0.9204</td>
<td>0.9213</td>
</tr>
<tr>
<td>2007</td>
<td>0.9660</td>
<td>0.9238</td>
<td>0.9307</td>
<td>0.9273</td>
</tr>
<tr>
<td>2006</td>
<td>1.0000</td>
<td>0.9769</td>
<td>0.9960</td>
<td>0.9341</td>
</tr>
<tr>
<td>2005</td>
<td>0.9572</td>
<td>0.9769</td>
<td>0.9381</td>
<td>0.9751</td>
</tr>
<tr>
<td>2004</td>
<td>0.9213</td>
<td>0.9960</td>
<td>0.9387</td>
<td>0.9751</td>
</tr>
<tr>
<td>2003</td>
<td>0.9238</td>
<td>0.9381</td>
<td>0.9310</td>
<td>0.9751</td>
</tr>
<tr>
<td>2002</td>
<td>0.9769</td>
<td>0.9960</td>
<td>0.9310</td>
<td>0.9751</td>
</tr>
</tbody>
</table>

Table III. Correlation matrices of MCap and corresponding value drivers for the period 2001-2010.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>0.9543</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.9478</td>
<td>0.9654</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0.9240</td>
<td>0.9233</td>
<td>0.9327</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.9123</td>
<td>0.9192</td>
<td>0.8969</td>
<td>0.9553</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.9024</td>
<td>0.9045</td>
<td>0.9022</td>
<td>0.9376</td>
<td>0.9675</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0.8857</td>
<td>0.8776</td>
<td>0.8794</td>
<td>0.9046</td>
<td>0.9511</td>
<td>0.9638</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0.8665</td>
<td>0.8639</td>
<td>0.8473</td>
<td>0.8915</td>
<td>0.9115</td>
<td>0.9317</td>
<td>0.9504</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.8521</td>
<td>0.8564</td>
<td>0.8388</td>
<td>0.8796</td>
<td>0.8882</td>
<td>0.9079</td>
<td>0.9150</td>
<td>0.9899</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.8485</td>
<td>0.8536</td>
<td>0.8318</td>
<td>0.8771</td>
<td>0.8858</td>
<td>0.8931</td>
<td>0.9018</td>
<td>0.9452</td>
<td>0.9687</td>
<td>1.0000</td>
</tr>
<tr>
<td>OD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>0.9165</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.8753</td>
<td>0.8752</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0.8620</td>
<td>0.8760</td>
<td>0.9461</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.8304</td>
<td>0.7708</td>
<td>0.8652</td>
<td>0.9240</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.7834</td>
<td>0.7326</td>
<td>0.8406</td>
<td>0.8918</td>
<td>0.9390</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0.7751</td>
<td>0.7481</td>
<td>0.8318</td>
<td>0.8768</td>
<td>0.8891</td>
<td>0.9023</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0.7742</td>
<td>0.7495</td>
<td>0.8036</td>
<td>0.8468</td>
<td>0.8704</td>
<td>0.8688</td>
<td>0.8899</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.7174</td>
<td>0.7117</td>
<td>0.7749</td>
<td>0.8290</td>
<td>0.8559</td>
<td>0.8602</td>
<td>0.8723</td>
<td>0.9060</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.7378</td>
<td>0.6861</td>
<td>0.7610</td>
<td>0.7913</td>
<td>0.8284</td>
<td>0.8165</td>
<td>0.8580</td>
<td>0.8329</td>
<td>0.8233</td>
<td>1.0000</td>
</tr>
<tr>
<td>NCJJOA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>0.8947</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.8606</td>
<td>0.8545</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0.8847</td>
<td>0.8839</td>
<td>0.8815</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.8572</td>
<td>0.8532</td>
<td>0.8673</td>
<td>0.9007</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.8784</td>
<td>0.8502</td>
<td>0.8581</td>
<td>0.8799</td>
<td>0.8986</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0.8541</td>
<td>0.8354</td>
<td>0.7926</td>
<td>0.8358</td>
<td>0.8759</td>
<td>0.8927</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0.8623</td>
<td>0.8526</td>
<td>0.7972</td>
<td>0.8615</td>
<td>0.8893</td>
<td>0.8950</td>
<td>0.9119</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.8499</td>
<td>0.8345</td>
<td>0.7768</td>
<td>0.8554</td>
<td>0.8062</td>
<td>0.8415</td>
<td>0.8724</td>
<td>0.9245</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.8245</td>
<td>0.7409</td>
<td>0.7899</td>
<td>0.8688</td>
<td>0.8244</td>
<td>0.8191</td>
<td>0.8651</td>
<td>0.8861</td>
<td>0.8592</td>
<td>1.0000</td>
</tr>
<tr>
<td>NCJHA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>0.7865</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.8011</td>
<td>0.8251</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0.7079</td>
<td>0.7450</td>
<td>0.8148</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>0.7289</td>
<td>0.7419</td>
<td>0.8104</td>
<td>0.8467</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.8324</td>
<td>0.8303</td>
<td>0.8194</td>
<td>0.7851</td>
<td>0.8469</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>0.7196</td>
<td>0.6542</td>
<td>0.6466</td>
<td>0.6840</td>
<td>0.8001</td>
<td>0.7339</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0.7219</td>
<td>0.7210</td>
<td>0.7454</td>
<td>0.8515</td>
<td>0.8193</td>
<td>0.7616</td>
<td>0.7758</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.7311</td>
<td>0.8192</td>
<td>0.8074</td>
<td>0.7509</td>
<td>0.7888</td>
<td>0.7292</td>
<td>0.7512</td>
<td>0.8084</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.6154</td>
<td>0.5826</td>
<td>0.7913</td>
<td>0.7060</td>
<td>0.8094</td>
<td>0.7373</td>
<td>0.7259</td>
<td>0.7341</td>
<td>0.7046</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table III. (continued)
have produced a high estimate of MCap in the other nine years as well. However, given the selection of value drivers, the existence of a high degree of multicollinearity is also likely.

4.2 Multicollinearity

Table IV contains the pair-wise Pearson correlations of all eight value drivers of the market as a whole for 2010. All eight value drivers exhibit positive and very strong relationships. Overall, the correlation coefficients range between 0.6220 and 0.9912, which may suggest that not all the value drivers share the same information content.

Two exceptions are noted, namely, the pairwise combinations of ordinary dividends (OD) and net cash inflow from operating activities (NCIFOA), and OD and NCIfIA. These two, cash-flow-based combinations are the only value drivers that exhibit correlation coefficients of less than 0.70. This might suggest that OD, NCIFOA and NCIfIA carry incremental information content, not only relative to the other cash-flow-based value drivers but also across all the value drivers, i.e. including those that were extracted from other types of financial statements.

From the evidence presented by Nel et al. (2014e, 2013d), one would be inclined to argue that the construction of a composite multiples model should incorporate headline earnings (HE) as an independent variable. From the correlation coefficient matrix in Table IV, it

<table>
<thead>
<tr>
<th></th>
<th>PBT</th>
<th>PAT</th>
<th>HE</th>
<th>BVE</th>
<th>OD</th>
<th>NCIFOA</th>
<th>NCIfIA</th>
<th>FCFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9912</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9404</td>
<td>0.9380</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.8007</td>
<td>0.8292</td>
<td>0.8173</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.8180</td>
<td>0.8237</td>
<td>0.7952</td>
<td>0.7330</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIFOA</td>
<td>0.8734</td>
<td>0.8669</td>
<td>0.8467</td>
<td>0.8021</td>
<td>0.6919</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.7987</td>
<td>0.7876</td>
<td>0.7525</td>
<td>0.7641</td>
<td>0.6220</td>
<td>0.8802</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>0.8567</td>
<td>0.8469</td>
<td>0.8275</td>
<td>0.7924</td>
<td>0.7311</td>
<td>0.8928</td>
<td>0.9102</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Notes: Note that the correlation matrices contain the logged correlation coefficients. There were numerous outliers in this study, which decreased the correlation coefficients. Consequently, a logged analysis was deemed more appropriate as it diminished the impact of these outliers. Own elaboration
seems prudent to consider OD or NCIfIA as a second independent variable. However, a carte blanche application of such a composite model is not warranted. Each of the six industries should be considered in isolation and a composite model consisting of a combination of HE, OD and NCIfIA may not be the de facto best choice for inclusion in every composite model.

From a financial statement perspective, all value drivers that were extracted from the same type of financial statement have high correlation coefficients, i.e. they share considerable information content. Value drivers that were extracted from the statement of comprehensive income, in particular, exhibit very high correlation coefficients – in the vicinity of 0.94 or higher. Similarly, value drivers that were extracted from the cash flow statement share considerable information content, which is evident from their respective correlation coefficients of around 0.90 or higher. This suggests a high likelihood of encountering a fair amount of multicollinearity when using regression analysis to the data.

The correlation matrices discussed thus far were based on the market as a whole, while the focus of this paper is on the construction of industry-specific composite multiples models. Consequently, it is equally important to compare the correlation coefficients of the equity-based value drivers on an industry basis as this forms the basis of the composite modelling. Table V contains these matrices for 2010.

The correlation coefficients contained in Table V indicate that the basic materials and financials industries also exhibit positive and very high correlations among the equity-based value drivers, on which the composite modelling in this paper is based. Although the majority of the pair-wise correlations in the Consumer Goods industry are highly positive, NCIfIA and OD exhibit a pairwise correlation of 0.5467, which is poor. In the consumer services industry, NCIfIA is poorly correlated with all the earning-based value drivers, indicating pairwise correlation coefficients between 0.5216 and 0.5875. Similarly, OD is poorly correlated with all the cash-flow-based value drivers, indicating pair-wise correlation coefficients of between 0.2182 and 0.6325. OD is particularly poorly correlated with NCIfIA, which is indicated by a correlation coefficient of 0.2182. In the industrials industry, NCIfIA is poorly correlated with all the non-cash-flow-based value drivers, which is reflected by correlation coefficients of between 0.3653 and 0.6453. In the technology industry, it is evident that OD is poorly correlated with all the other value drivers, reflecting correlation coefficients of around 0.40, or less, while NCIfIA is poorly correlated with BVE, indicating a correlation coefficient of 0.5303.

4.3 Composite model framework

To compile the composite multiples models, it was necessary to obtain the optimal weightings for each of the components to be included in each model. All eight equity-based single-factor multiples contained in Table I, namely, P/PBT, P/PAT, P/HE, P/BVE, P/OD, P/NCIfOA, P/NCIfIA and P/FCFE, were considered for inclusion in the composite models. These eight single-factor multiples emanate from four different value driver categories, namely, earnings, assets, dividends and cash flow. The inclusion of value drivers from four different value driver categories ensures that each value driver category potentially carries incremental information content as all four value driver categories originate from different financial statements. PAT, for example, was extracted from the statement of comprehensive income, and, while it is an indication of a company’s profitability, it does not represent cash in the bank for shareholders, i.e. profit after tax (PAT) is unlikely to culminate in an equally valued cash dividend. In this case, OD would be a more realistic value driver from an equity holder’s perspective.
<table>
<thead>
<tr>
<th></th>
<th>PBT</th>
<th>PAT</th>
<th>HE</th>
<th>BVE</th>
<th>OD</th>
<th>NCIfOA</th>
<th>NCIfIA</th>
<th>FCFE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic materials</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9934</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9150</td>
<td>0.9178</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.7833</td>
<td>0.8217</td>
<td>0.7915</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.7478</td>
<td>0.8432</td>
<td>0.8503</td>
<td>0.8185</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfOA</td>
<td>0.9128</td>
<td>0.9083</td>
<td>0.8888</td>
<td>0.9111</td>
<td>0.8658</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.8407</td>
<td>0.7946</td>
<td>0.7405</td>
<td>0.8611</td>
<td>0.7410</td>
<td>0.9068</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>0.8408</td>
<td>0.8081</td>
<td>0.7223</td>
<td>0.7598</td>
<td>0.7542</td>
<td>0.8730</td>
<td>0.9428</td>
<td>1.0000</td>
</tr>
<tr>
<td><strong>Consumer goods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9968</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9874</td>
<td>0.9888</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.9189</td>
<td>0.9192</td>
<td>0.9125</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.7402</td>
<td>0.7274</td>
<td>0.7346</td>
<td>0.6971</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfOA</td>
<td>0.9521</td>
<td>0.9562</td>
<td>0.9582</td>
<td>0.9247</td>
<td>0.6855</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.7640</td>
<td>0.7694</td>
<td>0.7771</td>
<td>0.7242</td>
<td>0.5467</td>
<td>0.8454</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>0.8951</td>
<td>0.8981</td>
<td>0.9114</td>
<td>0.8915</td>
<td>0.7738</td>
<td>0.9287</td>
<td>0.8011</td>
<td>1.0000</td>
</tr>
<tr>
<td><strong>Financials</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9989</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9156</td>
<td>0.9506</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.7991</td>
<td>0.8674</td>
<td>0.8391</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.8372</td>
<td>0.8327</td>
<td>0.7884</td>
<td>0.7326</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfOA</td>
<td>0.8119</td>
<td>0.8743</td>
<td>0.8096</td>
<td>0.8114</td>
<td>0.6325</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.5875</td>
<td>0.5216</td>
<td>0.5571</td>
<td>0.7103</td>
<td>0.2182</td>
<td>0.7344</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>0.7888</td>
<td>0.8136</td>
<td>0.7594</td>
<td>0.7140</td>
<td>0.5787</td>
<td>0.9196</td>
<td>0.8102</td>
<td>1.0000</td>
</tr>
<tr>
<td><strong>Industrials</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9965</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9310</td>
<td>0.9255</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.7886</td>
<td>0.8456</td>
<td>0.8060</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.9198</td>
<td>0.9179</td>
<td>0.8411</td>
<td>0.7646</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfOA</td>
<td>0.8222</td>
<td>0.8069</td>
<td>0.7653</td>
<td>0.7282</td>
<td>0.7029</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.8359</td>
<td>0.8147</td>
<td>0.7795</td>
<td>0.8216</td>
<td>0.7875</td>
<td>0.8855</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>0.8596</td>
<td>0.8461</td>
<td>0.8144</td>
<td>0.7921</td>
<td>0.8850</td>
<td>0.8713</td>
<td>0.9541</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table V. Correlation matrices for each of the six key industries for 2010 (continued)
From these eight single-factor multiples models, composite multiples models were constructed for each of the six key industries in the South African market. The breakdown of the composite models, based on the SAVE optimisation process, is contained in Table VI.

The following can be gleaned from the composite models: First, composite models do not perform the most accurate equity valuations across the board. The evidence suggests that in the consumer services industry, a single-factor multiple, specifically P/HE, is the optimal choice of multiple in 2008 and 2010. Similarly, P/HE is the optimal choice of multiple in the technology industry in 2003.

Second, the evidence suggests that there is no one-size-fits-all composite framework across all six industries, or even consistently so within any single industry. For example, while the composite multiples model in the basic materials industry in 2009 consists of five different single-factor multiples models, the composite multiples model in 2001 consists of just two.

Third, note that with the exception of 2007 in the basic materials industry, which consists of six single-factor multiples models, none of the composite multiples models consists of more than five single-factor multiples models, despite the availability of eight single-factor multiples models. The composite multiples models predominantly consist of two to four single-factor multiples models and the most common number of single-factor multiples models included in the composite multiples models is three. This suggests that an ad hoc addition of single-factor multiples models will not necessarily increase the valuation precision of the composite models.

Fourth, note how earning-based single-factor multiples models dominate the composition of the composite multiples models over all six industries. On average, earning-based value drivers, as a category, comprise between 40.90 and 89.68 per cent of the composite models, which confirms the superior valuation performance of earning-based multiples evident in the literature (Nel et al., 2014e, 2013d). Earning-based multiples carried a particularly heavy weighting in the consumer services and technology industries, comprising, on average, 89.68 and 78.05 per cent of the composite models respectively.

On an individual value driver basis, on average, the weighting assigned to HE is between 27.29 and 78.55 per cent, confirming its superiority among the individual value drivers selected for this study. HE comprised, on average, more than half the composition of the composite models in three industries, namely, consumer services (78.55 per cent), technology (62.67 per cent) and industrials (56.62 per cent). Profit before tax (PBT) managed to secure weightings of, on average, between 1.99 and 14.27 per cent over all the industries, with the exception of the consumer services industry, where it failed to secure a weighting. Similarly, PAT carried an average weighting of between 0.87 and 19.96 per cent over all six industries.

<table>
<thead>
<tr>
<th></th>
<th>PBT</th>
<th>PAT</th>
<th>HE</th>
<th>BVE</th>
<th>OD</th>
<th>NCIfOA</th>
<th>NCIIfIA</th>
<th>FCFE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBT</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAT</td>
<td>0.9925</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HE</td>
<td>0.9627</td>
<td>0.9644</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVE</td>
<td>0.8476</td>
<td>0.8567</td>
<td>0.8080</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OD</td>
<td>0.3498</td>
<td>0.3844</td>
<td>0.4284</td>
<td>0.3228</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfOA</td>
<td>0.8242</td>
<td>0.8371</td>
<td>0.8109</td>
<td>0.7965</td>
<td>0.2337</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCIfIA</td>
<td>0.6581</td>
<td>0.6804</td>
<td>0.7286</td>
<td>0.5303</td>
<td>−0.0097</td>
<td>0.9629</td>
<td>1.0000</td>
<td>0.9789</td>
</tr>
<tr>
<td>FCFE</td>
<td>0.8001</td>
<td>0.8165</td>
<td>0.8321</td>
<td>0.7861</td>
<td>0.3799</td>
<td>0.9332</td>
<td>0.9789</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table V. Own elaboration
<table>
<thead>
<tr>
<th>Year</th>
<th>Basic materials</th>
<th>Consumer goods</th>
<th>Consumer services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Earnings</td>
<td>Value drivers</td>
<td>Equity-based composite multiples</td>
</tr>
<tr>
<td></td>
<td>PBT</td>
<td>PAT</td>
<td>HE</td>
</tr>
<tr>
<td>2001</td>
<td>0.1264</td>
<td>0.8736</td>
<td>0.1239</td>
</tr>
<tr>
<td>2002</td>
<td>0.6968</td>
<td>0.1792</td>
<td>0.1239</td>
</tr>
<tr>
<td>2003</td>
<td>0.4467</td>
<td>0.3359</td>
<td>0.3050</td>
</tr>
<tr>
<td>2004</td>
<td>0.3591</td>
<td>0.3359</td>
<td>0.3050</td>
</tr>
<tr>
<td>2005</td>
<td>0.1674</td>
<td>0.0839</td>
<td>0.2924</td>
</tr>
<tr>
<td>2006</td>
<td>0.6968</td>
<td>0.5697</td>
<td>0.0438</td>
</tr>
<tr>
<td>2007</td>
<td>0.1301</td>
<td>0.1276</td>
<td>0.1960</td>
</tr>
<tr>
<td>2008</td>
<td>0.2826</td>
<td>0.1276</td>
<td>0.1960</td>
</tr>
<tr>
<td>2009</td>
<td>0.3648</td>
<td>0.2906</td>
<td>0.1712</td>
</tr>
<tr>
<td>2010</td>
<td>0.2820</td>
<td>0.1117</td>
<td>0.0210</td>
</tr>
</tbody>
</table>

Average 0.0708 0.0561 0.2820 0.1117 0.0210 0.2210

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumer goods</th>
<th>Consumer services</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>0.8311</td>
<td>0.6446</td>
</tr>
<tr>
<td>2002</td>
<td>0.4223</td>
<td>0.0867</td>
</tr>
<tr>
<td>2003</td>
<td>0.5858</td>
<td>0.815</td>
</tr>
<tr>
<td>2004</td>
<td>0.3648</td>
<td>0.0867</td>
</tr>
<tr>
<td>2005</td>
<td>0.2360</td>
<td>0.0867</td>
</tr>
<tr>
<td>2006</td>
<td>0.4197</td>
<td>0.0867</td>
</tr>
<tr>
<td>2007</td>
<td>0.5086</td>
<td>0.0867</td>
</tr>
<tr>
<td>2008</td>
<td>0.3648</td>
<td>0.0867</td>
</tr>
<tr>
<td>2009</td>
<td>0.6714</td>
<td>0.0867</td>
</tr>
<tr>
<td>2010</td>
<td>0.0131</td>
<td>0.0867</td>
</tr>
</tbody>
</table>

Average 0.1427 0.0269 0.9370 0.0310 0.0051 0.0472 0.0584

Table VI. Single-factor multiples models and their weightings, as included in the composite multiples models of six key South African industries for the period 2001-2010.
<table>
<thead>
<tr>
<th></th>
<th>Financials</th>
<th>Industrials</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PBT</td>
<td>PAT</td>
<td>HE</td>
</tr>
<tr>
<td>2001</td>
<td>–</td>
<td>–</td>
<td>0.7091</td>
</tr>
<tr>
<td>2002</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2003</td>
<td>0.0635</td>
<td>0.2384</td>
<td>0.2209</td>
</tr>
<tr>
<td>2004</td>
<td>0.6187</td>
<td>0.1806</td>
<td>–</td>
</tr>
<tr>
<td>2005</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2006</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2007</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2008</td>
<td>–</td>
<td>–</td>
<td>0.3766</td>
</tr>
<tr>
<td>2009</td>
<td>–</td>
<td>–</td>
<td>0.7601</td>
</tr>
<tr>
<td>2010</td>
<td>–</td>
<td>0.1593</td>
<td>0.8407</td>
</tr>
<tr>
<td>Average</td>
<td>0.0853</td>
<td>0.0199</td>
<td>0.3882</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.4934</td>
<td>0.2003</td>
<td>0.1490</td>
</tr>
<tr>
<td>2001</td>
<td>–</td>
<td>–</td>
<td>0.6565</td>
</tr>
<tr>
<td>2002</td>
<td>–</td>
<td>0.0743</td>
<td>0.9212</td>
</tr>
<tr>
<td>2003</td>
<td>–</td>
<td>0.0004</td>
<td>0.7157</td>
</tr>
<tr>
<td>2004</td>
<td>–</td>
<td>0.0117</td>
<td>0.8889</td>
</tr>
<tr>
<td>2005</td>
<td>–</td>
<td>–</td>
<td>0.7668</td>
</tr>
<tr>
<td>2006</td>
<td>0.1992</td>
<td>0.7950</td>
<td>–</td>
</tr>
<tr>
<td>2007</td>
<td>–</td>
<td>–</td>
<td>0.2594</td>
</tr>
<tr>
<td>2008</td>
<td>–</td>
<td>–</td>
<td>0.0085</td>
</tr>
<tr>
<td>2009</td>
<td>–</td>
<td>–</td>
<td>0.4477</td>
</tr>
<tr>
<td>2010</td>
<td>–</td>
<td>–</td>
<td>0.2025</td>
</tr>
<tr>
<td>Average</td>
<td>0.0199</td>
<td>0.0087</td>
<td>0.5662</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2002</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2003</td>
<td>–</td>
<td>–</td>
<td>1.0000</td>
</tr>
<tr>
<td>2004</td>
<td>–</td>
<td>–</td>
<td>0.8605</td>
</tr>
<tr>
<td>2005</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2006</td>
<td>0.1183</td>
<td>0.2650</td>
<td>0.4210</td>
</tr>
<tr>
<td>2007</td>
<td>–</td>
<td>–</td>
<td>0.8293</td>
</tr>
<tr>
<td>2008</td>
<td>–</td>
<td>–</td>
<td>0.6169</td>
</tr>
<tr>
<td>2009</td>
<td>0.6933</td>
<td>0.0010</td>
<td>–</td>
</tr>
<tr>
<td>2010</td>
<td>–</td>
<td>–</td>
<td>0.6583</td>
</tr>
<tr>
<td>Average</td>
<td>0.1159</td>
<td>0.0379</td>
<td>0.6267</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Note that there are years in which no weightings are allocated to any of the single-factor multiples, for example, 2004 in the consumer goods industry. This stems from insufficient data availability. Own elaboration

Table VI.
These findings concur with earlier evidence in the literature regarding the valuation performance of the P/HE, P/PBT and P/PAT single-factor multiples (Nel et al., 2014e).

Fifth, note the cash-flow-based value driver category’s unexpected contribution to the composition of the composite models. As a value driver category, cash flows generally produce the least accurate valuations, even less so than revenue (Nel et al., 2014e; 2013d). However, on an individual value driver basis, two of the cash-flow-based value drivers, namely, NCfOA and NCfIA, occupied, on average, between 0.01 and 13.40 per cent and between 1.11 and 14.95 per cent component shares, respectively, over five of the six industries. NCfOA failed to occupy a weighting in the financials industry and NCfIA failed to occupy a weighting in the consumer goods industry. NCfIA, in particular, when combined in a composite model with value drivers from other value driver categories, seems to contribute to a greater extent, in comparison to its isolation as a single-factor multiple. This suggests that NCfIA carries incremental information content, in addition to that offered by HE, for example. FCFE, the third cash-flow-based value driver, had the lowest component share of all eight value drivers, occupying, on average, less than five per cent of the composite models across all six industries. The latter concurs with the relatively poor valuation performance of P/FCFE as a single-factor multiple (Nel et al., 2014e, 2013d).

Sixth, the asset-based value driver category, on average, occupied similar weightings to the cash-flow-based value driver category. Although these two value driver categories, on average, on a per industry basis, managed to outperform each other interchangeably, their average weightings over all six industries were similar. The contribution of BVE to the composite models varied between 0.84 and 25.84 per cent and was particularly prevalent in the basic materials and financials industries, where it occupied, on average, 25.84 and 20.03 per cent component shares, respectively. However, the contribution of BVE in the consumer services (0.84 per cent) and technology (3.05 per cent) industries were insubstantial. It is of interest to note that, on average, BVE occupied a marginally smaller component share than the cash-flow-based value driver category over all six industries. This is in stark contrast with findings in developed markets, where BVE is frequently included as a second most well-weighted constituent in composite modelling (Penman, 1998; Schreiner, 2007; Yoo, 2006).

Seventh, the dividend-based value driver category, which, on average, over all six industries, occupied the smallest component share of all four value driver categories, contributed slightly less in a composite structure than when isolated as a single-factor multiple, culminating in component shares of between an average of 2.43 and 14.90 per cent. OD’s weightings in the consumer services (3.65 per cent) and technology (2.43 per cent) industries were insubstantial. OD carried its highest weighting in the financials (14.90 per cent), industrials (14.88 per cent) and consumer goods (14.55 per cent) industries.

These results suggest that composite multiples models offer superior explanatory power as compared to single-factor multiples models[2]. The question, however, is whether the increase in valuation precision that is offered by composite modelling, as compared to the more traditional single-factor modelling, is substantial.

4.4 Comparison between composite models and traditional models
The relative valuation performance of the composite multiples models and single-factor multiples models for the entire period from 2001 to 2010 is displayed in Table VII. The evidence suggests that composite multiples models carry incremental information content *vis-à-vis* single-factor multiples models. The impact of the incremental information, as encapsulated in the composite models, on the valuation precision of equity-based multiples for the period 2001-2010 is also summarised in Table VII.
Table VII. The relative valuation performance of composite multiples models and single-factor multiples models for the period 2001-2010.

<table>
<thead>
<tr>
<th>Years</th>
<th>IMP (%)</th>
<th>Composite</th>
<th>Earnings PAT</th>
<th>Assets BVE</th>
<th>Value drivers Dividends</th>
<th>Cash flows NCIfA</th>
<th>Average over all six industries (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>11.79</td>
<td>2.2472</td>
<td>5.1683</td>
<td>5.3511</td>
<td>2.5476</td>
<td>3.5311</td>
<td>4.4505 7.8506</td>
</tr>
<tr>
<td>2004</td>
<td>42.23</td>
<td>2.4297</td>
<td>5.8732</td>
<td>7.2742</td>
<td>4.2058</td>
<td>6.1338</td>
<td>5.2524 16.2399</td>
</tr>
<tr>
<td>2005</td>
<td>93.14</td>
<td>0.1404</td>
<td>2.3513</td>
<td>2.2748</td>
<td>2.2519</td>
<td>3.7836</td>
<td>2.1445 2.4633</td>
</tr>
<tr>
<td>2006</td>
<td>53.09</td>
<td>1.1029</td>
<td>2.3913</td>
<td>2.9278</td>
<td>5.2614</td>
<td>3.9667</td>
<td>2.8955 3.6810</td>
</tr>
<tr>
<td>2009</td>
<td>65.75</td>
<td>0.8941</td>
<td>3.0896</td>
<td>2.9063</td>
<td>3.5422</td>
<td>6.0400</td>
<td>2.8823 3.7800</td>
</tr>
<tr>
<td>Average</td>
<td>44.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer goods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>8.06</td>
<td>0.8352</td>
<td>0.9084</td>
<td>1.0947</td>
<td>1.8760</td>
<td>2.3139</td>
<td>1.0303 3.6869</td>
</tr>
<tr>
<td>2003</td>
<td>25.44</td>
<td>1.0724</td>
<td>2.3324</td>
<td>1.5359</td>
<td>1.7006</td>
<td>1.9225</td>
<td>1.4383 6.6236</td>
</tr>
<tr>
<td>2004</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA NA NA</td>
</tr>
<tr>
<td>2005</td>
<td>34.71</td>
<td>1.1610</td>
<td>3.3619</td>
<td>3.5189</td>
<td>2.3632</td>
<td>2.4711</td>
<td>2.3148 3.3265</td>
</tr>
<tr>
<td>2006</td>
<td>66.36</td>
<td>0.2665</td>
<td>1.0371</td>
<td>0.8101</td>
<td>1.4031</td>
<td>1.4754</td>
<td>1.1457 1.3783</td>
</tr>
<tr>
<td>2007</td>
<td>69.73</td>
<td>0.1870</td>
<td>1.0790</td>
<td>1.3535</td>
<td>0.6179</td>
<td>1.9899</td>
<td>0.8371 3.1381</td>
</tr>
<tr>
<td>2008</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA NA NA</td>
</tr>
<tr>
<td>2009</td>
<td>39.47</td>
<td>0.5340</td>
<td>1.1103</td>
<td>1.5043</td>
<td>0.8822</td>
<td>1.9448</td>
<td>0.9865 8.2273</td>
</tr>
<tr>
<td>2010</td>
<td>34.42</td>
<td>0.6577</td>
<td>1.8914</td>
<td>2.5620</td>
<td>1.0029</td>
<td>3.0222</td>
<td>2.4707 1.1963</td>
</tr>
<tr>
<td>Average</td>
<td>36.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table VII

#### Equity-based composite multiples

<table>
<thead>
<tr>
<th>Years</th>
<th>IMP (%)</th>
<th>Composite</th>
<th>Earnings</th>
<th>Assets</th>
<th>Value drivers</th>
<th>Cash flows</th>
<th>Average over all six industries (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>PBT</td>
<td>PAT</td>
<td>HE</td>
<td>BVE</td>
<td>OD</td>
</tr>
<tr>
<td>Consumer services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>0.00</td>
<td>7.2207</td>
<td>30.0320</td>
<td>30.0872</td>
<td>7.2207</td>
<td>33.5460</td>
<td>100.0802</td>
</tr>
<tr>
<td>Average</td>
<td>10.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| Financials |         |           |          |        |               |            |           |        |       |      |      |
| 2002  | NA      | NA        | NA       | NA     | NA            | NA         | NA        | NA      | NA      | NA      | 21.31 |
| 2004  | 56.79   | 1.9186    | 4.4428   | 5.7615 | 4.6680        | 6.4145     | 10.6677   | 5.9968  | 4.9267  | 27.32  | 27.32 |
| 2006  | NA      | NA        | NA       | NA     | NA            | NA         | NA        | NA      | NA      | NA      | 40.32 |
| 2008  | 41.94   | 2.1776    | 4.5077   | 5.3387 | 5.0752        | 3.7504     | 4.9347    | 51.6759 | 53.4294 | 94.2764 | 28.17 |
| 2009  | 49.96   | 0.2556    | 1.9994   | 1.1635 | 0.5108        | 2.0657     | 3.9273    | 5.6618  | 3.4355  | 2.9509  | 33.30 |
| Average| 38.69   |           |          |        |               |            |           |        |       |      |      |</p>
<table>
<thead>
<tr>
<th>Years</th>
<th>IMP (%)</th>
<th>Composite</th>
<th>Value drivers</th>
<th>Cash flows</th>
<th>Average over all six industries (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Earnings</td>
<td>Assets</td>
<td>Dividends</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PAT</td>
<td>HE</td>
<td>BVE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PBT</td>
<td>PAT</td>
<td>HE</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td></td>
<td>26.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Own elaboration
Note that the potential percentage increase in valuation precision (IMP) in Table VII indicates the extent to which equity-based composite multiples models outperformed the optimal equity-based, single-factor multiples models (highlighted) in each of the six industries. See Nel et al. (2014e) for a detailed discussion of the construction of optimal single-factor multiples. The description NA refers to industry years where there was insufficient data for comparison. A zero value in the IMP column, as is the case in the consumer services industry in 2008, for example, refers to industry years where specific single-factor multiples models produced the most accurate multiple, i.e. where composite multiples models failed to produce more accurate valuations than single-factor multiples models.

As is evident in Table VII, the results indicate that on average, there are substantial gains to be secured by using composite multiples models instead of single-factor multiples models. The average annual IMPs, i.e. over all six industries, are indicated in the last column in Table VII. The range of average annual IMPs over all six industries for each of the 10 years lies between 20.21 and 44.59 per cent, which is substantial. The consistency of the outperformance of composite multiples models over single-factor multiples models is evident in all the industries except for the Technology industry, where a lack of data obscured a more detailed analysis. Equally substantial gains can be secured on a per industry basis over the 10-year period, with an IMP range, on average, of between 10.12 and 44.11 per cent. With the exception of the consumer services industry, which secured precision gains of 10.12 per cent, all the industries indicate gains in excess of 25 per cent, on average.

Aside from the lp function in the R-package lpSolve, the solnp function (in the R-package Rsolnp), which is particularly adept at handling non-linear optimisations, was also used to determine the optimal weightings. Although not shown here, the results from the solnp function indicated a similar, but higher, average annual IMP range of precision gains of between 12.65 and 66.98 per cent over the 10-year period. On a per industry basis over the 10-year period, the IMPs, on average, ranged between 14.39 and 72.64 per cent. All the industries indicated substantial precision gains of 30 per cent or higher, on average, with the exception of the consumer services industry, which indicated an average gain in valuation precision of 14.39 per cent.

Although the data contained in Table VII reflects the magnitude of the increase in valuation precision that composite modelling may offer over single-factor modelling, the multi-dimensional nature of the data obscures a comprehensive grasp of the relative valuation performance of composite modelling over time. This is an important consideration for the way in which composite multiples models should be applied in practice. Because the data occupies multi-dimensional space – i.e. it encapsulates multiple coordinate axes – the use of a conventional two-dimensional scatter plot is inappropriate (Gower et al., 2011). However, the use of PCA biplots accommodates higher-dimensional data by approximating it in lower, usually two-dimensional space, thereby enabling the visualisation of multi-dimensional data.

### 4.5 Consistency of the valuation performance of composite models over time

The superior valuation performance of composite multiples models relative to single-factor multiples models can be illustrated more effectively with the help of PCA biplots. Figure 1, for example, depicts the valuation performance of the composite multiples models relative to that of the single-factor multiples models in the basic materials industry for the entire period from 2001 to 2010. The composite models are depicted to the far right of the PCA biplot, confirming their consistent superior valuation performance for the period from 2001 to 2010.

For a more detailed discussion on the use of biplots, see Gower et al. (2011).

Note that the axes are colour-coded. The ten pink axes reflect the fact that composite multiples models produced more accurate valuations than single-factor multiples models for all ten years between 2001 and 2010. The quality of display reading of the PCA biplot in Figure 1 is 75.09 per
cent and the predictivity readings fall between 0.103 and 0.934, which, apart from the years 2001 (0.103 reading) and 2006 (0.579), indicates an insignificant loss of information.

In summary, the evidence from the South African market suggests that a composite modelling approach to equity valuations outperforms the traditional single-factor modelling approach. How do these results compare with the results from other emerging markets and developed markets?

4.6 International comparison
Unfortunately, composite-related studies are limited, both in number and scope. In addition, the industries selected in these studies seldom match the six key industries for which sufficient data was available in the South African market. Those studies that do offer a comparative perspective on composite modelling, both concur with, and contradict, the findings from this paper.

The most comparable set of results was produced by Schreiner (2007), who compared a two-factor composite model over three industries in Europe and the USA. Schreiner’s overall results showed that two-factor composite multiples models produced, on average, 10.86 per cent more accurate valuations than single-factor multiples models in the USA and 15.32 per cent more accurate valuations in Europe. The South African results, therefore, concur with those of the developed markets, in that composite multiples models in the South African market produce more accurate valuations than single-factor multiples models. From
Section 4.4, it is evident that the magnitude of the improvement in valuation precision is more substantial in South Africa’s case. Unfortunately, a more detailed comparison is not possible as none of Schreiner’s selected industries correspond with any of the six key industries in the South African study.

However, the research results from this paper are in stark contrast with the results produced by Sehgal and Pandey (2010), who found conflicting evidence in South Africa’s case. On the basis of the root mean squared errors method, they found that two-factor composite multiples models failed to outperform optimal single-factor multiples models. Then, on the basis of Theil inequality coefficients, they found an insubstantial improvement in valuation precision of 4.17 per cent. Equally insubstantial and inconsistent results were found for the other emerging markets.

5. Conclusion

The aim of this paper was to determine whether industry-specific, equity-based, composite multiples models offer higher degrees of valuation precision compared to industry-specific, equity-based, single-factor multiples models. The findings confirmed that equity-based composite multiples models produced valuations that were substantially more accurate than those of single-factor multiples models.

The study focused on equity-based multiples, in particular, and the results were tested for the period between 2001 and 2010. On the basis of the SAVE method – the primary optimisation method that was applied in this study – composite models, on annual average, produced between 20.21 and 44.59 per cent more accurate valuations than single-factor multiples models for the period 2001–2010 did. Although this already presents a substantial IMP range, the results obtained from the MVE method indicated an even higher average annual IMP range of between 12.65 and 66.98 per cent. However, these results were not equally consistent over all six key industries. The composite multiples models failed to offer higher degrees of valuation precision compared to single-factor multiples models in 2008 and 2010 in the consumer services industry, and in 2003 in the technology industry.

An interesting phenomenon was observed regarding the valuation performance of the dividend-based value driver category within the context of composite modelling. The market- and industry-based research findings obtained from the finance literature suggest that dividends produce fairly accurate valuations. However, the dividend-based value driver category, on average, secured the lowest weighting of all four value driver categories, and had particularly low component shares in the consumer services and technology industries. Equally interesting was that on a value driver category basis, the cash-flow-based value driver category, which the finance literature suggests generally produces poor valuations in terms of valuation precision, managed to secure a higher weighting than the asset- and dividend-based value driver categories, on average.

As was gleaned from the finance literature, earning-based multiples contributed substantially to the valuation precision of the composite multiples models. Accordingly, earning-based multiples did, indeed, dominate the composition of the composite multiples models. Earning-based multiples occupied, on average, between 40.90 and 89.68 per cent of the composite models. The bulk of the earnings weighting was carried by HE, which comprised a component share of between 27.29 and 78.55 per cent, on average. These results concur with the valuation performance of earning-based multiples, and HE as a single-factor multiple, in particular, in the finance literature.

The evidence, therefore, suggests that equity-based composite modelling may offer substantial gains in valuation precision over equity-based, single-factor multiples modelling. These gains are, however, industry-specific and a *carte blanche* application thereof is ill
advised. Therefore, as analysts’ reports typically contain various single-factor multiples, it seems prudent to consider the inclusion of composite models as a more accurate alternative.

Although the research results concur with evidence from developed capital markets, they contradict the findings from the only other study conducted on composite modelling in emerging markets. Although it is not entirely clear why the research results from this study differ from those of the other emerging market-related study, it is possible that at least some of the discrepancies can be traced to different designs and methodologies applied in these studies.

The focus of this study was on equity-based modelling in particular. Although one may be inclined to consider company-based variables for inclusion in composite models, these models should be constructed in an internally consistent manner. Failure to do so may result in conceptually flawed models, which may obscure the interpretation of the results. Although it was not the focus of this study, a separate study, focused on company-based composite modelling, may produce interesting results.

Notes

1. Note that incorporating company-based, single-factor multiples into the equity-based composite model will result in model inconsistencies, which may obscure the interpretation of the results.

2. The data were also subjected to PCA on a per industry basis, following which PCR analysis was applied to the resulting two or three principal components, with similar results. Although the composite modelling via PCR indicated R-squared values of between 0.75 and 0.95, with statistically significant coefficients, at least at the 95 per cent confidence level, and of the correct sign (positive), various assumptions of the standard Gauss-Markov theorem were violated. Consequently, the regression results were omitted from the analysis.

3. The SSVE method was also applied via the solve.QP function in the R-package Quadprog, with similar results. However, given the non-linear nature of the data and its other limitations, these results are not shown here.

References


---

**Equity-based composite multiples**


Further reading


Corresponding author

Soon Nel can be contacted at: snel@sun.ac.za

For instructions on how to order reprints of this article, please visit our website: [www.emeraldgrouppublishing.com/licensing/reprints.htm](http://www.emeraldgrouppublishing.com/licensing/reprints.htm)

Or contact us for further details: permissions@emeraldinsight.com
Emerald is excited to announce a recent partnership with Peerwith, a platform that provides authors with a variety of services.

The Emerald Peerwith site can be found here: https://authorservices.emeraldpublishing.com/

Peerwith connects academics seeking support for their work with a relevant expert to get their research submission-ready. Peerwith experts can help with the following: language editing, copy editing, scientific editing, translation services, statistical support, funding application support, visuals, video, publication support, literature search, peer review and indexing services. Authors post their assignments on the Peerwith site, experts provide a quote, and the fee and conditions are then agreed upon directly between the author and the expert.

While we are not, of course, guaranteeing publication upon use of Peerwith, we hope that being able to direct academics to this resource either before submission or during the peer review process will help authors further improve the quality of their papers and increase their chances of positive reviews and acceptance.

Academics with relevant expertise can sign up as an expert on the Peerwith system here: https://www.peerwith.com/services/offer
Preserving over 100 years of management research online

A lifetime investment for your institution, Emerald Backfiles will significantly enhance your library’s offering by providing access to over 125,000 articles from more than 260 journals dating back to 1898.

Visit emeraldinsight.com

Get Backfiles Collections for your library
Recommend Backfiles to your librarian today.
Find out more: emeraldpublishing.com/backfilescollections
Number 43

129 Editorial advisory board

130 Editorial

131 Efectos de la realización de un megaevento deportivo sobre una economía local. El caso de los Juegos Mundiales 2013 Cali
Luis F. Aguado, Ana M. Osorio, Alexei Arbona and Jesús C. Peña-Vinces

154 Liderazgo orientado a la gente en call centers
Federico R. León, Oswaldo Morales, Juan D. Ramos, Álvaro Goyenechea, Paul A. Rojas, José Meza and Andrés Burga-León

168 The financial services industry and society: the role of incentives/punishments, moral hazard, and conflicts of interests in the 2008 financial crisis
Noel Murray, Ajay K. Manrai and Lalita Ajay Manrai

191 The role of liquidity in asset pricing: the special case of the Portuguese Stock Market
María del Mar Miralles-Quirós, José Luis Miralles-Quirós and Celia Oliveira

207 The use of the recognition heuristic as an investment strategy in European stock markets
Júlio Lobão, Luís Pacheco and Carlos Pereira

224 The valuation performance of mathematically-optimised, equity-based composite multiples
Soon Nel and Niël le Roux