



IE UNIVERSIDAD

TESIS DOCTORAL  
DOCTORAL DISSERTATION

RETRIBUCIÓN DE EJECUTIVOS Y PARTICIPACIÓN  
ACCIONARIAL EN LAS EMPRESAS ESPAÑOLAS.  
ANÁLISIS Y VALORACIÓN DE INCENTIVOS

EXECUTIVE COMPENSATION AND SHARE HOLDINGS  
IN SPANISH FIRMS. ANALYSIS AND VALUATION OF  
INCENTIVES

ERNESTO JESUS BAUTISTA ARGIBAY

SEGOVIA, 2022



IE UNIVERSIDAD

TESIS DOCTORAL  
DOCTORAL DISSERTATION

RETRIBUCIÓN DE EJECUTIVOS Y PARTICIPACIÓN  
ACCIONARIAL EN LAS EMPRESAS ESPAÑOLAS.  
ANÁLISIS Y VALORACIÓN DE INCENTIVOS

EXECUTIVE COMPENSATION AND SHARE HOLDINGS  
IN SPANISH FIRMS. ANALYSIS AND VALUATION OF  
INCENTIVES

ERNESTO JESUS BAUTISTA ARGIBAY

DOCTORAL THESIS ADVISOR: JUAN PEDRO  
GOMEZ LOPEZ

## **ABSTRACT (ENGLISH VERSION)**

This Dissertation analyzes executive compensation and incentives in Spanish listed companies between 2013 and 2017 using regulated reports (IAGCs & IARCs) that disclose executive share holdings and compensation plans in great detail. The research of this Dissertation is divided into the following areas:

- i. **Analysis of CEO Compensation Plan Design and Share Holdings.** CEO compensation design in Spanish firms is characterized by the **relevance of the short-term bonus** (which represent 35% of total estimated remuneration on average) and the **little use of restricted shares and stock options**. Besides compensation incentives, **CEOs in Spanish firms have an additional incentive that arises from their private investment in firm's shares**, which on average represents 155% of CEOs' total estimated remuneration.
- ii. **Relation between CEO Incentives and Firm Performance.** I found evidence of a **weak relationship between CEO incentives and firm performance** (this result refers to companies where the CEO is not a member of the founding family). **On average, CEOs receive 0.49 euros for each one thousand euro increase in shareholder value.** This result is lower than the 3.25 dollars obtained by Jensen & Murphy (1990), lower than the 25.11 dollars obtained by Hall & Liebman (1998) and higher than the 0.14 euros obtained by Gomez (2019). **Most of the relationship between CEO incentives and firm performance corresponds to**

**the private portfolio incentive, which highlights the importance of this incentive when studying executive compensation in Spanish firms.**

- iii. **Employee Stock Option Valuation Model (ESOVm).** This Dissertation develops a financial model to value employee stock options that incorporates their early exercise character into the calculations. The Employee Stock Option Valuation Model developed in this Dissertation is **much more accurate than the Black-Scholes-Merton formula in determining the value of employee stock options. The deviation between both models may reach 75% of the option value.**

## **ABSTRACT (SPANISH VERSION, *RESUMEN*<sup>1</sup>)**

La presente Tesis Doctoral analiza la remuneración y los incentivos de los ejecutivos de las empresas cotizadas españolas entre 2013 y 2017 utilizando informes regulatorios (IAGC y IARC) que proporcionan información con un elevado grado de detalle acerca de los planes de compensación y la inversión privada de los ejecutivos en acciones de la empresa. La investigación de esta Tesis Doctoral se divide en las siguientes áreas

- i. **Análisis de la remuneración de los CEOs y de sus participaciones accionariales.** El diseño de la retribución de los CEOs en las empresas españolas se caracteriza por la **relevancia del bonus a corto plazo** (que en promedio representa el 35% de la retribución total estimada) y el **escaso uso de acciones restringidas y opciones sobre acciones**. Además de los incentivos retributivos, **los CEOs de las empresas españolas tienen un incentivo adicional derivado de su inversión privada en acciones de la empresa**, el cual representa de media un 155% de la retribución total estimada de los CEOs.
  
- ii. **Relación entre los incentivos del CEO y el rendimiento de las empresas.** Esta Tesis Doctoral ha encontrado evidencia de una **relación débil entre los incentivos de los CEOs y el rendimiento de las empresas** (este resultado se refiere a empresas donde el CEO no es miembro de la familia fundadora). Los

---

<sup>1</sup> Las traducciones del inglés al español de esta Tesis Doctoral han sido realizadas con la ayuda del software Google Translator.

CEOs reciben de media 0,49 euros por cada mil euros de incremento de valor para el accionista. Este resultado es inferior a los 3,25 dólares obtenidos por Jensen & Murphy (1990), inferior a los 25,11 dólares obtenidos por Hall & Liebman (1998) y superior a los 0,14 euros obtenidos por Gómez (2019). **La mayor parte de la relación entre los incentivos de los CEOs y el rendimiento de las empresas corresponde al incentivo generado por la cartera privada** (inversión personal del CEO en acciones de la empresa), **lo que pone de relieve la importancia de este incentivo en el análisis de la retribución de los CEOs en las empresas españolas.**

iii. **Modelo de valoración de opciones sobre acciones para empleados (ESOVIM).**

Esta Tesis Doctoral ha desarrollado un modelo financiero para valorar las opciones sobre acciones concedidas a empleados. Este modelo financiero incorpora en sus cálculos la ejecución temprana que caracteriza a las opciones sobre acciones para empleados. **El modelo de valoración desarrollado en esta Tesis Doctoral resulta mucho más preciso que la fórmula de Black-Scholes-Merton para valorar opciones sobre acciones para empleados. La desviación entre ambos modelos puede alcanzar el 75% del valor de la opción.**

## **ACKNOWLEDGEMENT**

I owe my deepest gratitude to Dr. Juan Pedro Gomez Lopez, the Advisor of my DBA Program. This work would not have been possible without his direction, support and encouragement, including the development of a course on Corporate Finance that helped me to get a broad view about the research on this subject.

I also express my deepest gratitude to the Members of the Dissertation Tribunal: Dr. Elena Ferrer Zubiata, Dr. Fabio Feriozzi, Dr. Fernando Gallardo Olmedo, Dr. Garen Markarian, Dr. Manuel Monjas Barroso, Dr. Rocío Bonet and Dr. Vahid Saadi. The valuable comments and guidelines of the Tribunal enhanced the contribution of this Dissertation.

I express my gratitude to the Direction of the DBA Program, Dr. Elena Revilla, Dr. Laura Maguire and Dr. Rocio Bonet, for all the numerous activities that support the organization and development of the DBA Program. I also thank Ms. Ancir Salazar, Ms. Kathleen Mathison and Ms. Maria Muriel for their prompt and diligent assistance during the DBA Program.

I thank Dr. Luis Gomez-Mejia for the valuable lessons on Ethics & Humanities. I express my gratitude to Dr. Julio de Castro, Prof. Mahmoud Ezzamel and Dr. Fabrizio Salvador for their insights into Qualitative and Research Methods. I appreciate the lessons of Dr. Marco Caserta and Dr. Matthias Seifert on Quantitative Methods and their practical approach into this subject. I also appreciate the valuable Seminars of Dr. Marco Caserta on Ethics, Dr. Patricia Gabaldon on N-Vivo, Dr. Salvador Carmona on Paper Crafting

and Dr. Monika Hamori on Thesis Workshop. I thank Dr. Daniel Justin Blake, Dr. Luis Franco Diestre, Dr. Marco Giarratana, Dr. Carl Kock, Dr. Martina Montauti, Dr. Caterina Moschieri and Dr. Juan Santalo for their lessons on Strategy and Organizational Theory.

I also thank my dear DBA classmates and friends, Angel Rodero, Eva F. Vazquez, Dr. Poonam Jassi, George Stoyanov and Dr. Rodney McCowan. They all have been a source of inspiration, effort, leadership and resilience throughout the DBA Program and thereafter.

Finally, I thank all members and staff of IE University that provided the necessary support for the design and development of the DBA Program.

## Table of Contents

<b>Table of Figures</b>	<b>1</b>
<b>Table of Notations</b>	<b>5</b>
<b>Executive Summary (English Version)</b>	<b>9</b>
1. Analysis of CEO Compensation Plan Design and Share Holdings	12
2. Relation between CEO Incentives and Firm Performance	17
3. Employee Stock Option Valuation Model (ESOVM)	22
<b>Executive Summary (Spanish Version, <i>Resumen Ejecutivo</i>)</b>	<b>27</b>
1. Análisis de la remuneración de los CEOs y de sus participaciones accionariales	31
2. Relación entre los incentivos del CEO y el rendimiento de las empresas	37
3. Modelo de valoración de opciones sobre acciones para empleados	42
<b>1 Introduction</b>	<b>47</b>
1.1 Introduction (English Version)	47
1.2 Introduction (Spanish Version, <i>Introducción</i> )	53
<b>2 Literature Review</b>	<b>59</b>
2.1 The Agency Problem caused by the Separation of Management and Property	59
2.2 Main Theoretical Wings: Optimal Contracting Approach and Managerial Power Approach	65
2.3 Literature Review on CEO Compensation in other Countries different from the US	68
2.4 Literature Review on ESG Objectives	73
2.5 Literature Review on CEO Compensation and Firm Performance	77
2.6 Literature Review on the Valuation of Employee Stock Options	80
2.7 Literature Review on Stock Option Valuation Models	84
<b>3 Interest and Contributions of this Research</b>	<b>95</b>
<b>4 Research Questions</b>	<b>103</b>
4.1 CEO Shareholdings and Compensation Plan Design in Spanish Firms	104
4.2 CEO Incentives & Firm Performance	106
4.3 Employee Stock Option Valuation Model (ESOVM)	108
4.4 Summary	109
<b>5 Data</b>	<b>111</b>
5.1 Executive Data	111

5.2	Market Data	115
<b>6</b>	<b>Methodology</b>	<b>117</b>
6.1	Methodology for the Analysis of CEO Compensation Plan Design and Share Holdings	117
6.2	Methodology for the Analysis of the Relation between CEO Incentives and Firm Performance	120
6.3	Methodology for the Development of the Employee Stock Option Valuation Model (ESOVIM)	127
<b>7</b>	<b>Results &amp; Discussion regarding CEO Compensation Plan Design in Spanish Firms</b>	<b>131</b>
7.1	Description of CEO Compensation Plans between 2013 and 2017	131
7.1.1	Abengoa, S.A.	131
7.1.2	Abertis Infraestructuras, S.A.	134
7.1.3	Acciona, S.A.	137
7.1.4	Acerinox, S.A.	143
7.1.5	ACS, Actividades de Construcción y Servicios, S.A.	144
7.1.6	Aena SME, S.A.	146
7.1.7	Amadeus IT Group, S.A.	147
7.1.8	Banco Bilbao Vizcaya Argentaria, S.A.	149
7.1.9	Banco de Sabadell, S.A.	152
7.1.10	Banco Popular, S.A.	156
7.1.11	Banco Santander, S.A.	157
7.1.12	Bankia, S.A.	160
7.1.13	Bankinter, S.A.	162
7.1.14	Bolsas y Mercados Españoles, Sociedad Holding de Mercados y Sistemas Financieros, S.A.	164
7.1.15	Caixabank, S.A.	166
7.1.16	Cellnex Telecom, S.A.	169
7.1.17	Distribuidora Internacional de Alimentación, S.A.	170
7.1.18	Ebro Foods, S.A.	172
7.1.19	Enagas, S.A.	173
7.1.20	Endesa, S.A.	175
7.1.21	Ferrovial, S.A.	178
7.1.22	Fomento de Construcciones y Contratas, S.A.	183
7.1.23	Grifols, S.A.	186
7.1.24	Iberdrola, S.A.	188
7.1.25	Indra Sistemas, S.A.	190
7.1.26	Industria de Diseño Textil, S.A.	192
7.1.27	Inmobiliaria Colonial, SOCIMI, S.A.	196
7.1.28	International Consolidated Airlines Group, S.A.	198

7.1.29	Jazztel, P.L.C.	200
7.1.30	Mapfre, S.A.	204
7.1.31	Mediaset España Comunicación, S.A.	206
7.1.32	Melia Hotels International, S.A.	209
7.1.33	Merlin Properties, SOCIMI, S.A.	211
7.1.34	Naturgy Energy Group, S.A.	213
7.1.35	Obrascon Huarte Lain, S.A.	215
7.1.36	Red Electrica Corporacion, S.A.	217
7.1.37	Repsol, S.A.	220
7.1.38	Sacyr, S.A.	223
7.1.39	Siemens Gamesa Renewable Energy, S.A.	225
7.1.40	Tecnicas Reunidas, S.A.	227
7.1.41	Telefonica, S.A.	228
7.1.42	Viscofan, S.A.	240
7.2	Analysis of CEOs' compensation and incentives	242
7.3	Evolution of CEOs' compensation and incentives during the period under analysis	247
7.4	Analysis of Short-Term Bonus	252
7.5	International Comparison of CEO Compensation	256
7.6	Relation between CEO Shareholdings and CEO Compensation Components	258
7.7	Relation between CEO Shareholdings and CEO/Firm Characteristics	260
<b>8</b>	<b>Results &amp; Discussion regarding the Relation between CEO Incentives and Firm Performance</b>	<b>265</b>
<b>9</b>	<b>Results &amp; Discussion regarding the Employee Stock Option Valuation Model (ESOVM)</b>	<b>271</b>
<b>10</b>	<b>Conclusions</b>	<b>277</b>
10.1	Conclusions (English Version)	277
10.2	Conclusions (Spanish Version, <i>Conclusiones</i> )	285
<b>11</b>	<b>Limitations and Future Research</b>	<b>293</b>
<b>Appendix I. Initial Version of the Employee Stock Option Valuation Model (ESOVM<sub>i</sub>)</b>		<b>295</b>
<b>Appendix II. Optimized Version of the Employee Stock Option Valuation Model (ESOVM<sub>o</sub>)</b>		<b>301</b>

**Appendix III. Monte Carlo Restricted Share Valuation Model used to Value Telefonica Restricted Shares (Plan 2014 and Plan 2015)**  
**307**

**Appendix IV. Spanish Regulation on the Disclosure of Executive Compensation**  
**313**

Appendix IV.1 Spanish Regulation	314
Appendix IV.1.1 Royal Decree 377/1991	315
Appendix IV.1.2 Law 55/1999	315
Appendix IV.1.3 Royal Decree 1370/2000	315
Appendix IV.1.4 Circular 4/2000	317
Appendix IV.1.5 Law 26/2003	317
Appendix IV.1.6 Order ECO/3722/2003	318
Appendix IV.1.7 Circular 1/2004	318
Appendix IV.1.8 Royal Decree 1362/2007	318
Appendix IV.1.9 Circular 7/2007	320
Appendix IV.1.10 Royal-Decree Law 1/2010	320
Appendix IV.1.11 Law 2/2011	322
Appendix IV.1.12 Order ECC/461/2013	322
Appendix IV.1.13 Circular 4/2013	326
Appendix IV.1.14 Circular 5/2013	326
Appendix IV.2 Good Governance Codes	327
Appendix IV.2.1 Unified Good Governance Code of Listed Companies of 2006	327
Appendix IV.2.2 Unified Good Governance Code of Listed Companies of 2013	329
Appendix IV.2.3 Good Governance Code of Listed Companies of 2015	329
Appendix IV.3 Summary	333

**Appendix V. Examples of Processing and Tabulating IARC's Information**  
**339**

**References**  
**343**

## Table of Figures

Figure 1. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration).....	14
Figure 2. Estimated CEO remuneration structure in different countries.....	15
Figure 3. Euro amounts increase in CEO incentives for each one thousand euro increase in shareholder value. Aggregated data .....	19
Figure 4. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Yearly data.....	19
Figure 5. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Aggregated data.....	20
Figure 6. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Aggregated data.....	21
Figure 7. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula. Case of 4,874 options of Acciona Plan 2011 valued as of 31 December 2014.....	25
Figure 8. Retribución media estimada e incentivos de la cartera privada entre 2013 y 2017 (en porcentaje sobre la retribución estimada).....	32
Figure 9. Estructura retributiva estimada de los CEOs en diferentes países .....	34
Figure 10. Incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista. Datos agregados.....	38
Figure 11. Incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista. Datos anuales .....	39
Figure 12. Aumento en euros de los incentivos de los CEOs cuando el rendimiento de la empresa cambia del percentil 50 al percentil 75. Datos agregados .....	40
Figure 13. Aumento de los incentivos de los CEOs (sobre su compensación total estimada) cuando el rendimiento de la empresa cambia del percentil 50 al percentil 75. Datos agregados .....	41
Figure 14. Comparación entre el modelo de valoración de opciones sobre acciones para empleados (ESOV) y la fórmula de Black-Scholes-Merton. Caso correspondiente a 4.874 opciones del Plan 2011 de Acciona valoradas a 31 de diciembre de 2014 .....	44
Figure 15. Optimal contracting approach and managerial power approach.....	67
Figure 16. ESG objectives conceptual framework.....	75
Figure 17. Movements of stock price in the binomial model.....	90
Figure 18. Interest and contributions of the present research.....	99
Figure 19. Additional contribution of this research – Collection, detailed reading and analysis of the information of annual reports (IAGCs & IARCs).....	100

Figure 20. Additional contribution of this research – Number of pages processed in relation to executive compensation data.....	100
Figure 21. Additional contribution of this research – Compensation data entries .....	100
Figure 22. Summary of the contribution areas of this research.....	110
Figure 23. Calculation of annual shareholder value creation .....	127
Figure 24. Estimated remuneration and private portfolio incentives between 2013 and 2017 (euros) .....	242
Figure 25. Estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration).....	243
Figure 26. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (euros) .....	247
Figure 27. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration) .....	248
Figure 28. Usage of remuneration incentives and private portfolio incentives between 2013 and 2017.....	250
Figure 29. Short-term bonus compensation as percentage of salary .....	252
Figure 30. Classification of short-term bonus compensation.....	253
Figure 31. Variables used in the calculation of short-term bonuses.....	255
Figure 32. Estimated CEO remuneration structure in different countries.....	257
Figure 33. Regression between CEO shareholdings (as percentage of estimated remuneration) and CEO compensation components (as percentage of total estimated compensation) .....	258
Figure 34. Regression between CEO shareholding and CEO/Firm characteristics .....	261
Figure 35. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Aggregated data .....	266
Figure 36. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Yearly data .....	266
Figure 37. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Aggregated data.....	267
Figure 38. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Yearly data .....	267
Figure 39. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Aggregated data.....	268
Figure 40. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Yearly data .....	269
Figure 41. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula for the case of Spanish stock options .....	274

Figure 42. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula for the case of US stock options.....	275
Figure 43. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration).....	278
Figure 44. Estimated CEO remuneration structure in different countries.....	281
Figure 45. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula. Case of 4,874 options of Acciona Plan 2011 valued as of 31 December 2014.....	283
Figure 46. Retribución media estimada e incentivos de la cartera privada entre 2013 y 2017 (en porcentaje sobre la retribución estimada).....	286
Figure 47. Estructura retributiva estimada de los CEOs en diferentes países.....	289
Figure 48. Comparación entre el modelo de valoración de opciones sobre acciones para empleados (ESOVM) y la fórmula de Black-Scholes-Merton. Caso correspondiente a 4.874 opciones del Plan 2011 de Acciona valoradas a 31 de diciembre de 2014.....	292
Figure 49. Summary of Spanish regulation on the disclosure of executive compensation.....	333
Figure 50. Summary of Good Governance Codes' recommendations on the disclosure of executive information.....	336



## Table of Notations

Abengoa	Abengoa, S.A.
Abertis	Abertis Infraestructuras, S.A..
Acciona	Acciona, S.A.
Acerinox	Acerinox, S.A.
ACS	ACS, Actividades de Construcción y Servicios, S.A.
AENA	Aena SME, S.A.
Amadeus	Amadeus IT Group, S.A.
Bankia	Bankia, S.A.
Bankinter	Bankinter, S.A.
BBVA	Banco Bilbao Vizcaya Argentaria, S.A.
BME	Bolsas y Mercados Españoles, Sociedad Holding de Mercados y Sistemas Financieros, S.A.
Caixabank	Caixabank, S.A.
Cellnex	Cellnex Telecom, S.A.

CEO	Chief Executive Officer.
CNMV	Spanish Securities & Exchange Commission.
Colonial	Inmobiliaria Colonial, SOCIMI, S.A.
DIA	Distribuidora Internacional de Alimentacion, S.A.
Ebro	Ebro Foods, S.A.
Enagas	Enagas, S.A.
Endesa	Endesa, S.A.
ESG objectives	Environmental, social and corporate governance objectives.
ESOVM	The Employee Stock Option Valuation Model developed in this Dissertation.
FCC	Fomento de Contrucciones y Contratas, S.A.
Ferrovial	Ferrovial, S.A.
GGC 2006	Unified Good Governance Code of Listed Companies of 2006.
GGC 2013	Unified Good Governance Code of Listed Companies of 2013.
GGC 2015	Good Governance Code of Listed Companies of 2015.

Grifols	Grifols, S.A.
IAG	International Consolidated Airlines Group, S.A.
IAGC	Annual Corporate Governance Report.
IARC	Annual Director's Remuneration Report.
Iberdrola	Iberdrola, S.A.
Inditex	Industria de Diseño Textil, S.A.
Indra	Indra Sistemas, S.A.
Jazztel	Jazztel, P.L.C.
Mapfre	Mapfre, S.A.
Mediaset	Mediaset España Comunicación, S.A.
Melia	Melia Hotels International, S.A.
Merlin	Merlin Properties, SOCIMI, S.A.
Naturgy	Naturgy Energy Group, S.A.
Observation Period	It corresponds to the period 2013 - 2017.

OHL	Obrascon Huarte Lain, S.A.
Popular	Banco Popular, S.A..
REE	Red Electrica Corporacion, S.A.
Repsol	Repsol, S.A.
Sabadell	Banco de Sabadell, S.A.
Sacyr	Sacyr, S.A.
Santander	Banco Santander, S.A.
Siemens	Siemens Gamesa Renewable Energy, S.A.
Tecnicas	Tecnicas Reunidas, S.A.
Telefonica	Telefonica, S.A.
Viscofan	Viscofan, S.A.

## Executive Summary (English Version)

The collapse of house prices in the US between 2007 and 2009 implied the bankruptcy (or near bankruptcy) of several financial institutions and led to a financial crisis that spread worldwide (Saadi, 2020). Since the broke out of this financial crisis, there has been wide public debate regarding the regulation of executive compensation (Gete & Gomez, 2017).

In particular, “*academics, investors, policymakers, and the public*” have become increasingly concerned about executive compensation practices (Cavaco et al., 2000, p. 244). The following statement made by President Barack Obama in 2010 reflects the public concern about executive compensation:

*“This economic crisis began as a financial crisis, when banks and financial institutions took huge, reckless risks in pursuit of quick profits and massive bonuses”* (President Barack Obama, 2010<sup>2</sup>).

The main concerns about executive compensation are associated to whether executive pay levels are excessive and whether executive incentives are related to firm performance. The information about these questions would be useful for the general public, regulators, shareholders and corporate governance professionals.

---

<sup>2</sup> <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-financial-reform>.

During the development of this research, I had the opportunity to meet with the representatives of the Spanish Securities & Exchange Commission (CNMV) on the 10 January 2019 and on the 11 October 2019, where **the representatives of the CNMV expressed their concern about executive compensation plan design in Spanish firms and whether executives have enough incentives to improve firm performance.**

As mentioned in the seminal paper of Jensen & Meckling (1976), executive compensation constitutes a critical instrument to align the interests of executives with those of shareholders and, hence, to reduce the agency problem that arises from the separation of management and ownership.

In this regard, the increasing size of corporations hinders shareholders' monitoring of management activities (Markarian et al., 2007), which increases the importance of providing incentives to align the interest of executives with the interests of shareholders.

The research on executive compensation has been limited by the lack of available information about executive compensation plans. Companies and executives are reluctant to disclose information about compensation schemes. Therefore, this information is only publicly available when it is required by the regulation.

Due to the lack of available information in other countries different from the US, the vast majority of executive compensation research has been done with data of American companies (Baixauli & Sanchez-Marin, 2011), frequently using the database Compustat ExecuComp. This implies that there is a “*scarcity of international studies of executive compensation*” as mentioned by Boyd et al. (2012, p. 516).

The research of this Dissertation contributes to cover this gap in the literature by studying executive compensation in Spanish firms. This research uses data available in annual reports that the CNMV has required to Spanish listed companies between 2013 and 2017 (IAGCs and IARCs). These reports disclose executive compensation plans in great detail and they also provide information about the private investment of the CEO in company’s shares (an investment the CEO could dispose of at any time without any restriction).

Besides data availability, it is important to consider that Spain is one of the main economies in the world, which increases the relevance of studying executive compensation in Spanish firms. In this regard, Spain is the 13<sup>th</sup> world economy, having a GDP near to 110 billions of euros<sup>3</sup>. Likewise, several Spanish companies play a strong international role in traditional sectors such as construction or infrastructure (Gallardo & Villacorta, 2016).

---

<sup>3</sup> Ministry of Foreign Affairs, European Union and Cooperation of Spain (<http://www.exteriores.gob.es/Portal/en/PoliticaExteriorCooperacion/GlobalizacionOportunidadesRiesgos/Paginas/EspEnElMundoGlobalizado.aspx>).

Despite the available information in the IAGCs and IARCs, it has not been possible to find a valid identification instrument and, therefore, to establish a causal relationship in the analysis. Consequently, this Dissertation analyzes the relationship between variables without cause-effect implications due to the lack of a valid identification instrument.

The research of this Dissertation is divided into the following areas:

- i. Analysis of CEO Compensation Plan Design and Share Holdings.
- ii. Relation between CEO Incentives and Firm Performance.
- iii. Employee Stock Option Valuation Model (ESOVM).

The Executive Summary will cover these areas in the next Sub-Sections.

## **1. Analysis of CEO Compensation Plan Design and Share Holdings**

CEO compensation design in Spanish firms is characterized by the **relevance of the short-term bonus** (which represent 35% of total estimated remuneration on average) and the **little use of restricted shares and stock options**. Besides compensation incentives, **CEOs in Spanish firms have an additional incentive arising from their private investment in firm shares**, which on average represents 155% of CEOs' total estimated remuneration.

In relation to the **evolution of CEOs' compensation and incentives during the Observation Period**, the evidence shows that:

- i. **CEOs' estimated remuneration increased 8.03% annually during the Observation Period.** The growth in the estimated remuneration is 67,16% due to the increase in short and long term bonus. The impact of the annual change in the portfolio of restricted shares and stock options is relatively small due to the infrequent use of these incentives in Spanish firms.
- ii. **The short-term bonus is the most relevant compensation incentive throughout the Observation Period** (representing on average 35% of estimated remuneration) followed by the long-term bonus (which represent on average 11% of estimated remuneration).
- iii. **Almost all CEOs (98% of total observations) had short-term bonus plans**, and a significant proportion of CEOs (**80% of total observations**) had **long-term incentives** (long-term bonus, stock options or restricted shares).
- iv. **Almost all CEOs (95% of total observations) had a private investment in firm's shares** (an investment they could liquidate at any time). It is important to mention the high volatility of the annual change in the portfolio of private shares, which implies that the change in wealth arising from the portfolio of private shares varies significantly from year to year.

**Figure 1. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration)**

Description	2013	2014	2015	2016	2017	Total
Salary	35%	32%	33%	31%	29%	31%
Fixed remuneration	3%	2%	3%	2%	2%	2%
Membership of Committees	1%	1%	1%	1%	1%	1%
Attendance fees	1%	1%	1%	1%	1%	1%
Saving schemes	9%	13%	12%	14%	15%	13%
Other items	2%	1%	3%	3%	2%	2%
Short-term bonus	36%	37%	34%	33%	34%	35%
Long-term bonus	8%	7%	11%	11%	15%	11%
Restricted shares granted	6%	3%	5%	5%	1%	4%
Options granted	0%	3%	-	0%	0%	1%
<b>Estimated remuneration</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Annual change in portf. of rest. shares	3%	7%	-1%	0%	1%	2%
Annual change in portf. of options	8%	7%	4%	-2%	1%	3%
Annual change in portf. of private shares	536%	161%	-10%	217%	-49%	155%
<b>Annual change in portfolio</b>	<b>546%</b>	<b>175%</b>	<b>-7%</b>	<b>215%</b>	<b>-47%</b>	<b>160%</b>
<b>Change in estimated wealth</b>	<b>646%</b>	<b>275%</b>	<b>93%</b>	<b>315%</b>	<b>53%</b>	<b>260%</b>
Observations	33	35	36	39	33	176

Source: own preparation based on compensation included in firms' IAGCs and IARCs

In relation to the **analysis of short-term bonus (the most relevant CEOs' compensation incentive)**, the evidence shows that:

- i. **The short-term bonus represents on average an amount that is higher than CEOs' salary** in each of the years of the Observation Period, except in 2013 where it was lower (representing 98% of CEOs' salary on average).
- ii. **Short-term bonuses almost always provide some remuneration to CEOs** (only 4% of the observations did not provide any short-term bonus amount). **However, it is relatively difficult for CEOs to achieve the maximum short-term bonus amount** (only 24% of the observations provided the maximum amount).

iii. **Income and sales are the most frequent quantitative variables used in the calculation of short-term bonuses.** On average, income had a 54% and sales a 12% weight in the calculation of short-term bonuses. The rest of the quantitative variables are used much less than income and sales in the calculation of short-term bonuses.

The following figure compares the remuneration structure of CEOs in Spain with the remuneration structure of CEOs in other countries.

**Figure 2. Estimated CEO remuneration structure in different countries**

Country	No. Observations	Mean Salary (Euro)	Median Salary (Euro)	Salary (%)	Bonus (%)	Options & Restr. Shares (%)	Other (%)
Norway	227	1,159,338	327,639	77%	10%	7%	7%
Sweden	659	1,444,972	562,867	65%	13%	2%	20%
Italy	488	2,831,137	1,629,794	57%	14%	9%	20%
Switzerland	210	4,082,886	1,991,037	51%	14%	24%	10%
Ireland	406	2,293,473	966,115	47%	15%	27%	11%
United Kingdom	3957	1,923,829	1,075,328	48%	17%	26%	9%
France	1455	2,117,052	739,288	63%	18%	16%	3%
Netherlands	583	1,587,789	982,917	49%	19%	19%	13%
Belgium	218	1,444,972	730,887	60%	20%	10%	11%
Germany	582	2,612,711	1,621,393	42%	40%	10%	8%
<b>Europe an average</b>	<b>N/A</b>	<b>2,149,816</b>	<b>1,062,727</b>	<b>56%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>
<b>United States</b>	<b>13361</b>	<b>4,116,490</b>	<b>2,352,280</b>	<b>30%</b>	<b>22%</b>	<b>42%</b>	<b>6%</b>
<b>Spain</b>	<b>176</b>	<b>1,038,733</b>	<b>856,500</b>	<b>31%</b>	<b>45%</b>	<b>5%</b>	<b>19%</b>

Source: own preparation based on compensation included in firms' IAGCs and IARCs and Edmans et al. (2017)

The previous figure shows that:

i. **Salary compensation of CEOs in Spanish firms is fairly low on average in comparison with salary compensation of CEOs in other countries.** There are some countries (i.e., France, Germany or Ireland) where the average CEO salary is more than twice the average salary received by CEOs in Spanish firms.

- ii. **Bonus compensation of CEOs have the maximum relevance in Spanish firms,** where on average it represents 45% of total CEO estimated remuneration, while it represents below 22% in other countries except in Germany where it reaches 40%.
  
- iii. **Stock options and restricted shares compensation is fairly low in Spanish firms,** where on average they only represent 5% of total CEO estimated remuneration, while in other countries they represent a higher percentage except in the case of Sweden.

Regarding the relation between CEO shareholdings and CEO compensation components:

- i. There is a positive relationship between CEO shareholdings (measured as percentage of estimated remuneration) and the following CEO compensation components: salary and other compensation (measured as percentage of estimated remuneration).
  
- ii. There is a negative relationship between CEO shareholdings (measured as percentage of estimated remuneration) and CEO compensation incentives (measured as percentage of estimated remuneration). This implies that **the larger CEO's personal investments in firm shares, the lesser the compensation incentives (short-term and long-term bonus, restricted shares and stock options) that are granted to the CEO.**

Regarding the relation between CEO shareholdings and CEO/firm characteristics:

- i. There is evidence supporting a positive relation between CEO shareholdings (measured in euros) and CEO age, stock options grants and the CEO being the founder or a member of the founding family. **CEOs have greater shareholdings (measured in euros) as the CEO gets older, as the CEO receives stock option grants and as the CEO belongs to the founding family.**
- ii. There is also evidence supporting a positive relation between CEO shareholdings (measured as percentage of total equity) and CEO age, duality and the CEO being the founder or a member of the founding family. **CEOs have greater shareholdings (measured as percentage of total equity) as the CEO gets older, as the CEO simultaneously occupies the CEO and the President position, and as the CEO belongs to the founding family.** In addition, **CEO shareholding (measured as percentage of total equity) decreases with CEO tenure and firm size.**

## **2. Relation between CEO Incentives and Firm Performance**

The analysis of the relation between CEO compensation and firm performance applies the same methodology that has been used by the literature on this subject. In this regard, the literature (Jensen & Murphy, 1990; Hall & Liebman, 1998; Gomez, 2019) has used the following pay-performance sensitivity measures:

- i. *“The expected variation in the value of the director’s portfolio for every 1,000 euros of variation in the value of the company’s shares”* (Gomez, 2019, p. 144).

This measure indicates how much euro incentive the CEO receives per 1,000 euros of value created for shareholders.

- ii. *“How much the value in euros of the director’s portfolio of shares and options changes at the end of each year when the return hypothetically doubles, moving from the median return of the sample to the 75th percentile”* (Gomez, 2019, p.

145). This measure indicates how much euro incentive the CEO receives when the company’s return increases from the median to the 75th percentile.

- iii. *“The expected percentage change in the director’s estimated wealth at the end of the year in response to changes in the company’s return”* corresponding to an increase from the median return to the 75th percentile return (Gomez, 2019, p. 145). This measure indicates how much incentive the CEO receives, expressed as percentage of CEO’s estimated compensation, when the company’s return increases from the median to the 75th percentile.

Regarding the calculation of CEO estimated compensation, I consider the compensation that was accrued in each year of the Observation Period. In addition, I exclude observations where the CEO is the founder or a member of the founding family because these observations are outliers in term of the private investment of the CEO in company’s

shares (these outliers have a much higher private investment in company's shares than the rest of the observations).

The following table shows the euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. On average, **the incentive arising from the private portfolio (0.27 euros) is higher than the incentive provided by restricted shares (0.07 euros) and stock options (0.15 euros).**

**Figure 3. Euro amounts increase in CEO incentives for each one thousand euro increase in shareholder value. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	0.07	0.44	-	-	-	-	-	0.01	0.05	1.04	5.23
Stock Options	0.15	0.90	-	-	-	-	-	-	0.13	4.36	8.10
Shares Priv. Portfolio	0.27	0.40	-	-	0.00	0.01	0.07	0.38	0.94	1.49	1.74
Observations	155										

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the euro amount increase in CEO incentives for each one thousand euro increase in shareholder value calculated for each year of the Observation Period. The incentive provided by restricted shares significantly decreased between 2013 and 2015, and then it went up again from 2015 to 2017. The incentive provided by stock options decreased during the Observation Period from 0.31 euros to 0.02 euros, while the incentive provided by the private portfolio remained fairly steady.

**Figure 4. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Yearly data**

Description	2013	2014	2015	2016	2017	2013-2017
Restricted Shares	0.05	0.18	0.01	0.03	0.07	0.07
Stock Options	0.31	0.30	0.08	0.07	0.02	0.15
Shares Private Portfolio	0.27	0.29	0.24	0.24	0.32	0.27
Observations	29	31	32	34	29	155

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the euro amount increase in CEO incentives when company's return changes from the median to percentile 75th. Only a small percentage of CEOs receive incentives of restricted shares and stock options. That is the reason why a significant proportion of the observations has no pay-performance sensitivity of restricted shares and stock options.

On the other hand, there is a considerable incentive arising from the private investment of CEOs in company's shares. This incentive is present in a significant proportion of all the observations and it reaches a maximum of more than 8.86 million of euros when firm's return changes from the median to percentile 75th.

**Figure 5. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	92,081	291,525	-	-	-	-	-	14,841	269,780	1,579,124	1,732,030
Stock Options	102,558	474,480	-	-	-	-	-	-	83,928	2,527,798	3,998,603
Shares Priv. Portfolio	641,837	1,618,257	-	-	135	12,122	95,050	337,801	1,236,748	8,091,447	8,857,451
Observations	155										

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the percentage increase in CEO incentives (over total estimated compensation) when company's return changes from percentile 50th to percentile 75th. This measure is called the elasticity of incentives to changes in shareholder value (Hall & Liebman, 1998).

The average elasticity is 4% for restricted shares and 5% for stock options, which sums up to 9% elasticity corresponding to compensation components. This means that **for each percentage increase in firm value, the CEO receive compensation incentives**

(increase in the value of restricted shares and options) **that represent 9% over CEO's estimated remuneration.**

Besides the compensation incentives, CEOs also have incentives arising from their private investment in company's shares. The elasticity of this private incentive is 14% on average, which highlights the relevance of the private portfolio incentive.

**Figure 6. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	0.04	0.29	-	-	-	-	-	0.00	0.04	0.22	3.65
Stock Options	0.05	0.43	-	-	-	-	-	-	0.03	0.60	5.29
Shares Priv. Portfolio	0.14	0.27	-	-	0.00	0.01	0.03	0.12	0.44	1.28	1.36
Observations	155										

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

In conclusion, this research found **evidence of a weak relationship between CEO incentives and firm performance (this result refers to companies where the CEO is not a member of the founding family). On average, CEOs receive 0.49 euros for each one thousand euro increase in shareholder value.** This result is lower than the 3.25 dollars obtained by Jensen & Murphy (1990), lower than the 25.11 dollars obtained by Hall & Liebman (1998) and higher than the 0.14 euros obtained by Gomez (2019). **Most of the relationship between CEO incentives and firm performance corresponds to the private portfolio incentive, which highlights the importance of this incentive when studying executive compensation in Spanish firms.**

It would be possible to extend the present research by incorporating the analysis of ESG (environmental, social and corporate governance) objectives. ESG objectives have become increasingly important for corporations in recent years and compensation plans are becoming more and more associated to ESG objectives. An extension of the present research could analyze the relationship between executive incentives and ESG objectives.

### **3. Employee Stock Option Valuation Model (ESOVVM)**

In the literature so far, **employee stock options have been valued using the Black-Scholes-Merton formula and applying inaccurate proxies to consider that these options tend to be exercised early.** In particular, the literature has frequently assumed that employee stock options were either exercised:

- i. At the first date of the exercise period. This assumption results in a lower value than the actual value of the options because it completely omits all the time value of the options after the first date of the exercise period.
- ii. At the end of the exercise period. This assumption results in a higher value than the actual value of the options because it considers all the time value of the options while employees sacrifice part of this time value because of the early exercise.

The Employee Stock Option Valuation Model developed in this research uses the Monte Carlo methodology to value employee stock options. The Monte Carlo methodology constitutes a widely recognized approach to valuing derivatives and making investment decisions (Monjas & Balibrea, 2014).

The Monte Carlo methodology is based on generating random simulations of the stock price path and calculating the option payoff on each of these simulations, obtaining the value of the option as the present value of the average payoff in the simulations.

The Monte Carlo methodology represents a much more flexible approach than the Black-Scholes-Merton formula. Using the Monte Carlo methodology, I incorporated the early exercise of executive stock options into the design of the Employee Stock Option Valuation Model. In this regard, I considered the analysis developed by Bettis et al. (2005), which concludes that executives sacrifice up to 10% of option value because of early exercise. The conclusion of Bettis et al. (2005) is also supported by the studies of Heron & Lie (2017), who found that executives sacrifice 12.2% of option value, and Boyd et al. (2010), who found that executives sacrifice 8.8% of option value. Huddart et al. (1994) also concludes that early option exercise takes place when the option is deep in the money, which is consistent with the 10% estimation of sacrificed option value (which implies that 90% of option value is intrinsic value and, hence, that the option is deep in the money).

In this way, the Employee Stock Option Valuation Model developed in this research considers that CEOs will execute the option during the exercise period when the sacrificed value is equal or lower than the previous 10% reference rate. Consequently, the implementation of the Monte Carlo methodology requires the calculation of the option market value for each date of the exercise period and for each one of the simulations, which I performed using the Black-Scholes-Merton approach (it is necessary to know this value to determine whether the option would be executed in the time period of the simulation at consideration).

Appendix I contains the Matlab code corresponding to the initial version of the Employee Stock Option Valuation Model (ESOVM<sub>i</sub>), and Appendix II contains the Matlab code for the optimized and more efficient version of the Employee Stock Option Valuation Model (ESOVM<sub>o</sub>).

The Employee Stock Option Valuation Model (ESOVM) represents an innovative approach to value employee stock options. The Employee Stock Option Valuation Model incorporates the early exercise character of employee stock options into the calculations. Consequently, **the Employee Stock Option Valuation Model is much more accurate than the Black-Scholes-Merton formula in determining the value of employee stock options. The deviation between both models may reach 75% of option value**, as in the example shown in the following figure.

**Figure 7. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula. Case of 4,874 options of Acciona Plan 2011 valued as of 31 December 2014**

<b>Model</b>	<b>Approximation for the exercise date</b>	<b>Valuation (Euros)</b>	<b>Deviation (% over ESOVM)</b>
Employee Stock Option Valuation Model	N/A	61,180	-
Black-Scholes-Merton	First date of the exercise period	15,597	-74.5%
Black-Scholes-Merton	End date of the exercise period	66,004	7.9%

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

It would be possible to extend the Employee Stock Option Valuation Model in future research by incorporating option characteristics such as relative performance (i.e., considering that the payoff will depend on the stock price increase relative to peer companies). In this way, the Employee Stock Option Valuation Model could be used to value this kind of stock options.



## **Executive Summary (Spanish Version, *Resumen Ejecutivo*)**

El colapso de los precios de la vivienda en EE.UU. entre 2007 y 2009 implicó la quiebra (o casi la quiebra) de varias instituciones financieras y dio lugar a una crisis que se extendió por todo el mundo (Saadi, 2020). Desde que estalló esta crisis financiera, ha habido un gran debate público sobre la regulación de la compensación de los directivos (Gete & Gomez, 2017).

En particular, el interés de “*académicos, inversores, legisladores y el público general*” por las prácticas de compensación de ejecutivos ha crecido cada vez más (Cavaco et al., 2000, p. 244). La siguiente declaración hecha por el presidente Barack Obama en 2010 refleja la preocupación existente con respecto a la retribución de los ejecutivos:

*“Esta crisis económica comenzó como una crisis financiera, cuando los bancos y las instituciones financieras asumieron riesgos enormes e imprudentes en busca de ganancias rápidas y bonus inmensos”* (Presidente Barack Obama, 2010<sup>4</sup>).

La preocupación acerca de la remuneración de los ejecutivos está asociada a si los niveles de remuneración de los ejecutivos son excesivos y si los incentivos de los ejecutivos están relacionados con el rendimiento de las empresas. El análisis de estos aspectos sería de utilidad para el público en general, los organismos reguladores, los accionistas y los profesionales del gobierno corporativo.

---

<sup>4</sup> <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-financial-reform>.

Durante el desarrollo de esta investigación, tuve la oportunidad de reunirme con los representantes de la Comisión Nacional del Mercado de Valores (CNMV) el 10 de enero de 2019 y el 11 de octubre de 2019. En estas reuniones, **los representantes de la CNMV expresaron su preocupación acerca del diseño de los planes de compensación** para ejecutivos en las empresas españolas y acerca de **si los ejecutivos tienen suficientes incentivos para mejorar el rendimiento de sus empresas.**

Conforme establecieron Jensen y Meckling (1976), la remuneración constituye un instrumento crítico para alinear los intereses de los ejecutivos con los intereses de los accionistas y, por tanto, para reducir el problema de agencia que surge de la separación de la gestión y la propiedad empresarial.

En este sentido, el tamaño cada vez mayor de las corporaciones dificulta la supervisión de las actividades de gestión por parte de los accionistas (Markarian et al., 2007), lo que aumenta la importancia de proporcionar incentivos para alinear el interés de los ejecutivos con los intereses de los accionistas.

La investigación sobre la compensación de ejecutivos se ha visto limitada por la falta de información disponible sobre los planes de compensación de ejecutivos. En este sentido, tanto las empresas como los ejecutivos se muestran reacios a revelar información sobre los esquemas de compensación. Por lo tanto, esta información solo está disponible públicamente cuando así lo requiere la regulación.

Debido a la falta de información disponible en otros países diferentes a Estados Unidos, la gran mayoría de las investigaciones sobre remuneración de ejecutivos se ha realizado con datos de empresas estadounidenses (Baixauli & Sanchez-Marin, 2011), utilizando frecuentemente la base de datos Compustat ExecuComp. Esto implica que haya una *“escasez de estudios internacionales sobre retribución de ejecutivos”* como señalan Boyd et al. (2012, pág.516).

La investigación de esta Tesis Doctoral contribuye a cubrir la falta de estudios sobre la retribución de ejecutivos en otros países diferentes a Estados Unidos. En este sentido, la presente Tesis Doctoral efectúa su estudio sobre empresas españolas, utilizando los datos disponibles en los informes anuales que la CNMV ha exigido a las sociedades cotizadas españolas entre 2013 y 2017 (IAGC y IARC). Estos informes contienen información muy detallada sobre los planes de compensación y también brindan información sobre la inversión privada del CEO en acciones de la empresa (una inversión de la que el CEO podría disponer en cualquier momento sin ninguna restricción).

Unido a la disponibilidad de datos, es importante tener en cuenta que España es una de las principales economías del mundo, lo que aumenta la relevancia de estudiar la retribución de los ejecutivos en las empresas españolas. En este sentido, España es la decimotercera economía mundial, con un PIB cercano a los 110 mil millones de euros<sup>5</sup>.

---

<sup>5</sup> Ministry of Foreign Affairs, European Union and Cooperation of Spain (<http://www.exteriores.gob.es/Portal/en/PoliticaExteriorCooperacion/GlobalizacionOportunidadesRiesgos/Paginas/EspEnElMundoGlobalizado.aspx>).

Asimismo, varias empresas españolas desempeñan un fuerte papel internacional en sectores tradicionales como la construcción o las infraestructuras (Gallardo & Villacorta, 2016).

A pesar de la detallada información disponible en los IAGC y los IARC, no ha sido posible encontrar ningún instrumento válido de identificación ni, por tanto, establecer una relación causal en el análisis desarrollado. En consecuencia, la presente Tesis Doctoral analiza la relación entre las variables sin implicaciones de causa-efecto debido a la falta de un instrumento válido de identificación.

La investigación de esta Tesis Doctoral se divide en las siguientes áreas:

- i. Análisis de la remuneración de los CEOs y de sus participaciones accionariales.
- ii. Relación entre los incentivos del CEO y el rendimiento de las empresas.
- iii. Modelo de valoración de opciones sobre acciones para empleados.

El Resumen Ejecutivo cubrirá estas áreas de investigación en las siguientes Sub-Secciones.

## **1. Análisis de la remuneración de los CEOs y de sus participaciones accionarias**

El diseño de la retribución de los ejecutivos en las empresas españolas se caracteriza por la **relevancia del bonus a corto plazo** (que representa en promedio el 35% de la retribución total estimada) y el escaso uso de acciones restringidas y opciones sobre acciones. Además de los incentivos retributivos, **los ejecutivos de las empresas españolas tienen un incentivo adicional derivado de su inversión privada en acciones de la empresa**, el cual representa en promedio el 155% de su retribución total estimada.

Con respecto a la evolución de las remuneraciones e incentivos de los CEO durante el período de observación, la evidencia encontrada muestra que:

- i. **La remuneración estimada de los ejecutivos tuvo un incremento del 8,03% anual.** Este crecimiento de la retribución estimada se debe en un 67,16% al incremento del bonus a corto y largo plazo. El impacto de la variación anual de la cartera de acciones restringidas y opciones sobre acciones es relativamente pequeño debido al escaso uso de estos incentivos en las empresas españolas.
- ii. **El bonus a corto plazo es el incentivo retributivo más relevante del periodo de observación** (representando en promedio el 35% de la retribución total estimada) seguido del bonus a largo plazo (que representa en promedio el 11% de la retribución total estimada).

- iii. **Casi todos los ejecutivos (98% del total de observaciones) han tenido planes de bonus a corto plazo**, y una proporción significativa de ejecutivos (**80% del total de observaciones) han tenido incentivos a largo plazo** (bonus a largo plazo, opciones sobre acciones o acciones restringidas).
- iv. **Casi todos los ejecutivos (95% del total de observaciones) han tenido inversión privada en acciones de la empresa** (inversión que podían liquidar en cualquier momento). Es importante mencionar la alta volatilidad de la variación anual de la cartera privadas de acciones, lo que implica que la riqueza generada por esta cartera varíe significativamente de un año a otro.

**Figure 8. Retribución media estimada e incentivos de la cartera privada entre 2013 y 2017 (en porcentaje sobre la retribución estimada)**

Descripción	2013	2014	2015	2016	2017	Total
Sueldos	35%	32%	33%	31%	29%	31%
Remuneración fija	3%	2%	3%	2%	2%	2%
Pertenencia a comisiones	1%	1%	1%	1%	1%	1%
Diets	1%	1%	1%	1%	1%	1%
Sistemas de ahorro	9%	13%	12%	14%	15%	13%
Otros	2%	1%	3%	3%	2%	2%
Bonus a corto plazo	36%	37%	34%	33%	34%	35%
Bonus a largo plazo	8%	7%	11%	11%	15%	11%
Acc. restr. otorgadas	6%	3%	5%	5%	1%	4%
Opciones otorgadas	0%	3%	-	0%	0%	1%
<b>Remuneración estimada</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Var. anual acc. restringidas	3%	7%	-1%	0%	1%	2%
Var. anual opciones	8%	7%	4%	-2%	1%	3%
Var. anual acc. privadas	536%	161%	-10%	217%	-49%	155%
<b>Var. anual acc. y opciones</b>	<b>546%</b>	<b>175%</b>	<b>-7%</b>	<b>215%</b>	<b>-47%</b>	<b>160%</b>
<b>Var. en riqueza estimada</b>	<b>646%</b>	<b>275%</b>	<b>93%</b>	<b>315%</b>	<b>53%</b>	<b>260%</b>
Observaciones	33	35	36	39	33	176

Fuente: elaboración propia a partir de la compensación incluida en los IAGC y los IARC de las empresas

Con respecto al **análisis del bonus a corto plazo (el incentivo más relevante de los planes de remuneración)**, la evidencia muestra que:

- i. **El bonus a corto plazo representa en promedio un importe superior al salario de los CEOs** en cada uno de los años del período de observación, excepto en 2013, en donde fue menor (representando en promedio el 98% del salario de los CEOs).
- ii. **El bonus a corto plazo casi siempre proporciona alguna remuneración a los CEOs** (solo el 4% de los bonus a corto plazo no proporcionó ninguna remuneración). **Sin embargo, es relativamente difícil para los ejecutivos alcanzar el importe máximo del bonus a corto plazo** (solo el 24% de los bonus a corto plazo proporcionaron el importe máximo).
- iii. **Los ingresos y las ventas son las variables cuantitativas más utilizadas en el cálculo de los bonus a corto plazo.** En promedio, los ingresos tuvieron un peso del 54% y las ventas del 12% en el cálculo del bonus a corto plazo. El resto de las variables cuantitativas tienen un peso mucho menor que los ingresos y las ventas en el cálculo de los bonus a corto plazo.

La siguiente figura compara la estructura retributiva de los CEOs en España con la estructura retributiva de los CEOs en otros países:

**Figure 9. Estructura retributiva estimada de los CEOs en diferentes países**

País	Nº Observ.	Salario medio (euros)	Salario mediano (euros)	Salario (%)	Bonus (%)	Opciones y Acc. restr. (%)	Otros (%)
Noruega	227	1.159.338	327.639	77%	10%	7%	7%
Suecia	659	1.444.972	562.867	65%	13%	2%	20%
Italia	488	2.831.137	1.629.794	57%	14%	9%	20%
Suiza	210	4.082.886	1.991.037	51%	14%	24%	10%
Irlanda	406	2.293.473	966.115	47%	15%	27%	11%
Reino Unido	3.957	1.923.829	1.075.328	48%	17%	26%	9%
Francia	1.455	2.117.052	739.288	63%	18%	16%	3%
Países Bajos	583	1.587.789	982.917	49%	19%	19%	13%
Bélgica	218	1.444.972	730.887	60%	20%	10%	11%
Alemania	582	2.612.711	1.621.393	42%	40%	10%	8%
<b>Media europea</b>	<b>N/A</b>	<b>2.149.816</b>	<b>1.062.727</b>	<b>56%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>
<b>Estados Unidos</b>	<b>13.361</b>	<b>4.116.490</b>	<b>2.352.280</b>	<b>30%</b>	<b>22%</b>	<b>42%</b>	<b>6%</b>
<b>España</b>	<b>176</b>	<b>1.038.733</b>	<b>856.500</b>	<b>31%</b>	<b>45%</b>	<b>5%</b>	<b>19%</b>

Fuente: elaboración propia a partir de la compensación incluida en los IAGC y los IARC de las empresas y Edmans et al. (2017)

Como se observa en la figura anterior:

- i. **La remuneración salarial de los CEOs de las empresas españolas resulta mucho más baja en promedio que la remuneración salarial de los CEO de otros países.** En este sentido, hay algunos países (p.ej.: Francia, Alemania o Irlanda) en donde el salario medio de los CEO es más del doble que el salario medio que reciben los CEOs de las empresas españolas.
- ii. **Los bonus de los CEOs alcanzan la máxima relevancia en las empresas españolas,** en donde de media representan el 45% de la retribución total estimada de los CEOs, mientras que representan menos del 22% en otros países (excepto en Alemania, en donde alcanzan el 40%).

- iii. **La retribución mediante acciones restringidas y opciones es significativamente baja en las empresas españolas**, en donde de media tan solo representan el 5% de la retribución total estimada del CEO, mientras que en otros países representan un porcentaje significativamente superior (excepto en el caso de Suecia).

Con respecto al análisis de la inversión privada de los CEOs y los componentes de su remuneración:

- i. Existe una relación positiva entre la inversión privada del CEO (medida como porcentaje de la remuneración estimada) y los siguientes componentes de compensación del CEO: salario y otras remuneraciones (medidos como porcentaje de la remuneración estimada).
- ii. Existe una relación negativa entre la inversión privada del CEO (medida como porcentaje de la remuneración estimada) y los incentivos de su compensación (medidos como porcentaje de la remuneración estimada). Esto implica que **cuanto mayor es la inversión del CEO en acciones de la empresa, menores son los incentivos remuneratorios (bonus a corto y largo plazo, acciones restringidas y opciones sobre acciones) que se otorgan al CEO.**

Con respecto a la relación existente entre la inversión en acciones del CEO y las características del CEO / empresa:

- i. Existe evidencia que respalda una relación positiva entre la inversión en acciones del CEO (medidas en euros) y la edad del CEO, el otorgamiento de opciones sobre acciones y el hecho de que el CEO sea el fundador o un miembro de la familia fundadora. **La inversión privada de los CEOs en acciones de la empresa (medida en euros) es mayor a medida que el CEO envejece, que el CEO recibe opciones sobre acciones y que el CEO pertenezca a la familia fundadora.**
  
- ii. Existe evidencia que respalda una relación positiva entre la inversión en acciones del CEO (medida como porcentaje del capital total) y la edad del CEO, la dualidad asociada a ocupar también el cargo de Presidente, y el hecho de que el CEO sea el fundador o un miembro de la familia fundadora. **La inversión privada de los CEOs en acciones de la empresa (medida como porcentaje del capital total) aumenta a medida que el CEO envejece, que el CEO ocupe simultáneamente el puesto de CEO y Presidente y que el CEO pertenezca a la familia fundadora. Además, la participación del CEO (medida como porcentaje del capital total) disminuye con la antigüedad del CEO en su cargo y el tamaño de la empresa.**

## **2. Relación entre los incentivos del CEO y el rendimiento de las empresas**

El análisis de la relación entre los incentivos del CEO y el rendimiento de las empresas realizado en la presente Tesis Doctoral utiliza la misma metodología que ha sido utilizada en la literatura sobre este tema. En este sentido, la literatura (Jensen y Murphy, 1990; Hall y Liebman, 1998; Gomez, 2019) ha utilizado las siguientes medidas para analizar la relación entre los incentivos del CEO y el rendimiento de las empresas:

- i. *“La variación esperada en el valor de la cartera del ejecutivo por cada 1.000 euros de variación en el valor de las acciones de la empresa”* (Gómez, 2019, p. 144). Esta medida indica cuánto incentivo en euros recibe el CEO por cada 1.000 euros de valor creado para los accionistas.
- ii. *“Cuánto cambia el valor en euros de la cartera de acciones y opciones del ejecutivo al final de cada año en el caso hipotético de que la rentabilidad se duplique, pasando de la rentabilidad mediana de la muestra al percentil 75”* (Gómez, 2019, p. 145). Esta medida indica cuánto incentivo en euros recibe el CEO cuando el rendimiento de la empresa aumenta desde la mediana hasta el percentil 75.

- iii. “El cambio porcentual esperado en la riqueza estimada del ejecutivo al final del año ante un cambio en el rendimiento de la empresa” correspondiente a un aumento desde la rentabilidad mediana hasta el percentil 75 (Gómez, 2019, p. 145). Esta medida indica cuánto incentivo recibe el CEO, expresado como porcentaje sobre su compensación estimada, cuando el rendimiento de la empresa aumenta desde la mediana hasta el percentil 75.

En cuanto al cálculo de la compensación del CEO, el análisis realizado ha tenido en cuenta la compensación devengada en cada año del período de observación. Asimismo, este análisis ha excluido aquellas observaciones en las que el CEO es el fundador o un miembro de la familia fundadora toda vez que estas observaciones constituyen valores atípicos en términos de la inversión privada del CEO en acciones de la empresa (estos valores atípicos tienen una inversión privada mucho mayor que el resto de observaciones).

La siguiente tabla muestra el incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista. En promedio, **el incentivo correspondiente a la cartera privada (0,27 euros) es superior al incentivo que brindan las acciones restringidas (0,07 euros) y las opciones (0,15 euros).**

**Figure 10. Incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista. Datos agregados**

Descripción	Media	D. Típica	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Acciones restringidas	0,07	0,44	-	-	-	-	-	0,01	0,05	1,04	5,23
Opciones	0,15	0,90	-	-	-	-	-	-	0,13	4,36	8,10
Acciones privadas	0,27	0,40	-	-	0,00	0,01	0,07	0,38	0,94	1,49	1,74
Observaciones	155										

Fuente: IARC, IAGC, Bloomberg, modelos financieros desarrollados en esta investigación y elaboración propia

La siguiente tabla muestra el incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista calculado para cada año del período de observación. El incentivo proporcionado por las acciones restringidas disminuyó significativamente entre 2013 y 2015, y luego volvió a subir de 2015 a 2017. El incentivo proporcionado por las opciones sobre acciones disminuyó durante el período de observación de 0,31 euros a 0,02 euros, mientras que el incentivo proporcionado por la cartera privada se mantuvo relativamente estable.

**Figure 11. Incremento en euros de los incentivos de los CEOs por cada incremento de mil euros en el valor para el accionista. Datos anuales**

Descripción	2013	2014	2015	2016	2017	2013-2017
Acciones restringidas	0,05	0,18	0,01	0,03	0,07	0,07
Opciones	0,31	0,30	0,08	0,07	0,02	0,15
Acciones privadas	0,27	0,29	0,24	0,24	0,32	0,27
Observaciones	29	31	32	34	29	155

*Fuente: IARC, IAGC, Bloomberg, modelos financieros desarrollados en esta investigación y elaboración propia*

La siguiente tabla muestra el aumento en euros de los incentivos de los CEOs cuando el rendimiento de la empresa cambia de la mediana al percentil 75. Solo un pequeño porcentaje de CEOs recibe incentivos en forma de acciones restringidas y opciones sobre acciones. Por este motivo, un elevado número de observaciones tiene un aumento nulo en el valor de las acciones restringidas y de las opciones sobre acciones.

Por otro lado, existe un incentivo considerable que surge de la inversión privada de los CEOs en las acciones de la empresa. Este incentivo está presente en casi todas las observaciones y alcanza un máximo superior a 8,86 millones de euros medido como el importe del incentivo cuando la rentabilidad de la empresa pasa de la mediana al percentil 75.

**Figure 12. Aumento en euros de los incentivos de los CEOs cuando el rendimiento de la empresa cambia del percentil 50 al percentil 75. Datos agregados**

Descripción	Media	D. Típica	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Acciones restringidas	92.081	291.525	-	-	-	-	-	14.841	269.780	1.579.124	1.732.030
Opciones	102.558	474.480	-	-	-	-	-	-	83.928	2.527.798	3.998.603
Acciones privadas	641.837	1.618.257	-	-	135	12.122	95.050	337.801	1.236.748	8.091.447	8.857.451
Observaciones	155										

*Fuente: IARC, IAGC, Bloomberg, modelos financieros desarrollados en esta investigación y elaboración propia*

La siguiente tabla muestra el aumento porcentual de los incentivos de los CEOs (sobre su compensación total estimada) cuando el rendimiento de la empresa cambia de la mediana al percentil 75. Esta medida se denomina elasticidad de los incentivos ante cambios en el valor para los accionistas (Hall y Liebman, 1998).

Como se puede observar en la tabla siguiente, la elasticidad promedio es del 4% para acciones restringidas y del 5% para opciones sobre acciones, lo que representa un 9% de elasticidad correspondiente a los componentes retributivos. Esto significa que **por cada punto porcentual de aumento en el valor de la empresa, el CEO recibe incentivos retributivos** (aumento en el valor de su cartera de acciones restringidas y opciones) **que representan un 9% sobre la remuneración estimada del CEO.**

Además de los incentivos retributivos, los CEOs también tienen incentivos derivados de su inversión privada en acciones de la empresa. La elasticidad promedio de este incentivo es del 14% lo que destaca nuevamente la relevancia del incentivo de la cartera privada.

**Figure 13. Aumento de los incentivos de los CEOs (sobre su compensación total estimada) cuando el rendimiento de la empresa cambia del percentil 50 al percentil 75. Datos agregados**

Descripción	Media	D. Típica	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Acciones restringidas	0,04	0,29	-	-	-	-	-	0,00	0,04	0,22	3,65
Opciones	0,05	0,43	-	-	-	-	-	-	0,03	0,60	5,29
Acciones privadas	0,14	0,27	-	-	0,00	0,01	0,03	0,12	0,44	1,28	1,36
Observaciones	155										

*Fuente: IARC, IAGC, Bloomberg, modelos financieros desarrollados en esta investigación y elaboración propia*

En conclusión, Tesis Doctoral ha encontrado **evidencia de una relación débil entre los incentivos de los CEOs y el rendimiento de las empresas** (este resultado se refiere a empresas donde el CEO no es miembro de la familia fundadora). **Los CEOs reciben de media 0,49 euros por cada mil euros de incremento de valor para el accionista.** Este resultado es inferior a los 3,25 dólares obtenidos por Jensen & Murphy (1990), inferior a los 25,11 dólares obtenidos por Hall & Liebman (1998) y superior a los 0,14 euros obtenidos por Gómez (2019). **La mayor parte de la relación entre los incentivos de los CEOs y el rendimiento de las empresas corresponde al incentivo generado por la cartera privada** (inversión personal del CEO en acciones de la empresa), **lo que pone de relieve la importancia de este incentivo en el análisis de la retribución de los CEOs en las empresas españolas.**

Sería posible ampliar la presente investigación incorporando el análisis de los objetivos ESG (ambientales, sociales y gubernamentales). Los objetivos ESG se han vuelto cada vez más importantes para las empresas en los últimos años y los planes de compensación están asociados cada vez más al cumplimiento de objetivos ESG. De esta forma, la ampliación de la presente investigación podría analizar la relación existente entre los incentivos de los CEOs y los objetivos ESG.

### **3. Modelo de valoración de opciones sobre acciones para empleados**

Hasta el momento, **la literatura ha valorado las opciones sobre acciones de los empleados utilizando la fórmula de Black-Scholes-Merton y aplicando aproximaciones inexactas para considerar que dichas opciones tienden a ejercerse de forma temprana.** En particular, la literatura frecuentemente ha asumido que las opciones sobre acciones de los empleados se ejercen:

- i. En la primera fecha del período de ejercicio. Esta asunción da como resultado un valor de la opción más bajo que su valor real toda vez que omite por completo el valor temporal de la opción después de la primera fecha del período de ejercicio.
- ii. En la última fecha del período de ejercicio. Esta suposición da como resultado un valor de la opción más alto que su valor real toda vez que considera todo el valor temporal de la opción, mientras que los empleados sacrifican parte de este valor temporal debido al ejercicio temprano.

El modelo de valoración de opciones sobre acciones para empleados desarrollado en esta investigación utiliza la metodología de Monte Carlo. La metodología Monte Carlo consiste en generar simulaciones aleatorias de la trayectoria del precio de la acción y calcular el resultado de la opción en cada una de estas simulaciones, obteniendo el valor de la opción como el valor presente del resultado promedio de todas las simulaciones.

La metodología de Monte Carlo representa un enfoque mucho más flexible que la fórmula de Black-Scholes-Merton. Utilizando la metodología Monte Carlo, he considerado el ejercicio temprano de las opciones sobre acciones en el diseño del Modelo de Valoración de Opciones de Acciones para Empleados. En este sentido, he considerado el análisis realizado por Bettis et al. (2005), el cual concluye que los ejecutivos sacrifican hasta el 10% del valor de la opción debido al ejercicio temprano. La conclusión de Bettis et al. (2005) también está respaldada por los estudios de Heron & Lie (2017), quienes encontraron que los ejecutivos sacrifican el 12,2% del valor de la opción, y Boyd et al. (2010), quienes encontraron que los ejecutivos sacrifican el 8.8% del valor de la opción. Huddart et al. (1994) también concluyen que el ejercicio temprano de la opción tiene lugar cuando la opción está muy en el dinero, lo cual es consistente con la estimación del 10% del valor sacrificado de la opción (que implica que el 90% del valor de la opción es valor intrínseco y, por tanto, que la opción está muy en el dinero).

El Modelo de valoración de opciones sobre acciones para empleados desarrollado en la presente Tesis Doctoral considera que los CEOs ejecutarán la opción durante el período de ejercicio cuando el valor sacrificado sea igual o menor al parámetro de referencia anteriormente reseñado del 10%. En consecuencia, la implementación de la metodología de Monte Carlo requiere el cálculo del valor de mercado de la opción para cada fecha del período de ejercicio y para cada una de las simulaciones utilizando la fórmula de Black-Scholes-Merton (es necesario determinar este valor para evaluar si la opción se ejecutaría en cada uno de los períodos de tiempo considerados en cada simulación).

El Apéndice I contiene el código Matlab correspondiente a la versión inicial del Modelo de valoración de opciones sobre acciones para empleados (ESOVM<sub>i</sub>), y el Apéndice II contiene el código Matlab para la versión optimizada y más eficiente del Modelo de valoración de opciones sobre acciones para empleados (ESOVM<sub>o</sub>).

En conclusión, el Modelo de valoración de opciones sobre acciones para empleados (ESOVM) representa un enfoque innovador para valorar este tipo de opciones. Este Modelo de valoración incorpora el carácter de ejercicio temprano de las opciones sobre acciones para empleados en sus cálculos sin necesidad de efectuar ninguna aproximación. De este modo, **el modelo de valoración desarrollado en esta Tesis Doctoral resulta mucho más preciso que la fórmula de Black-Scholes-Merton para valorar opciones sobre acciones para empleados. La desviación entre ambos modelos puede alcanzar el 75% del valor de la opción**, como se puede observar en el ejemplo recogido en la figura siguiente.

**Figure 14. Comparación entre el modelo de valoración de opciones sobre acciones para empleados (ESOVM) y la fórmula de Black-Scholes-Merton. Caso correspondiente a 4.874 opciones del Plan 2011 de Acciona valoradas a 31 de diciembre de 2014**

Modelo	Aproximación de la fecha de ejercicio	Valoración (euros)	Desviación (% sobre ESOVM)
ESOVM	N/A	61.180	-
Black-Scholes-Merton	Primera fecha del periodo de ejercicio	15.597	-74,5%
Black-Scholes-Merton	Última fecha del periodo de ejercicio	66.004	7,9%

*Fuente: IARC, IAGC, Bloomberg, modelos financieros desarrollados en esta investigación y elaboración propia*

Sería posible ampliar el Modelo de valoración de opciones sobre acciones para empleados en investigaciones futuras incorporando características de las opciones como el rendimiento relativo (es decir, considerando que el resultado de la opción dependerá del rendimiento de las empresas pares). De esta forma, el modelo de valoración de opciones sobre acciones para empleados podría ser ampliado para valorar este tipo de opciones sobre acciones.



# 1 Introduction

## 1.1 Introduction (English Version)

The collapse of house prices in the US between 2007 and 2009 implied the bankruptcy (or near bankruptcy) of several financial institutions and led to a financial crisis that spread worldwide (Saadi, 2020). Since the broke out of this financial crisis, there has been wide public debate regarding the regulation of executive compensation (Gete & Gomez, 2017).

In particular, “*academics, investors, policymakers, and the public*” have become increasingly concerned about executive compensation practices (Cavaco et al., 2000, p. 244). The following statement made by President Barack Obama in 2010 reflects the public concern about executive compensation:

*“This economic crisis began as a financial crisis, when banks and financial institutions took huge, reckless risks in pursuit of quick profits and massive bonuses”* (President Barack Obama, 2010<sup>6</sup>).

The main concerns about executive compensation are associated to whether executive pay levels are excessive and whether executive incentives are related to firm performance. The information about these questions would be useful for the general public, regulators, shareholders and corporate governance professionals.

---

<sup>6</sup> <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-financial-reform>.

During the development of this research, I had the opportunity to meet with the representatives of the Spanish Securities & Exchange Commission (CNMV) on the 10 January 2019 and on the 11 October 2019, where the representatives of the CNMV expressed their concern about executive compensation plan design in Spanish firms and whether executives have enough incentives to improve firm performance.

As mentioned in the seminal paper of Jensen & Meckling (1976), executive compensation constitutes a critical instrument to align the interests of executives with those of shareholders and, hence, to reduce the agency problem that arises from the separation of management and ownership.

In this regard, the increasing size of corporations hinders shareholders' monitoring of management activities (Markarian et al., 2007), which increases the importance of providing incentives to align the interest of executives with the interests of shareholders.

In this way, executive compensation can be viewed as a solution to the agency problem caused by the separation of management and property. However, executive compensation can also be viewed as part of this agency problem, leading to excessive pay. The latter perspective argues that executive compensation represents a mechanism to extract rents from the company, and that executive pay is above optimal levels.

The research on executive compensation has been limited by the lack of available information about executive compensation plans. Companies and executives are reluctant to disclose information about compensation schemes. Therefore, this information is only publicly available when it is required by the regulation.

Due to the lack of available information in other countries different from the US, the vast majority of executive compensation research has been done with data of American companies (Baixauli & Sanchez-Marin, 2011), frequently using the database Compustat ExecuComp. This implies that there is a “*scarcity of international studies of executive compensation*” as mentioned by Boyd et al. (2012, p. 516).

The research of this Dissertation contributes to cover this gap in the literature by studying executive compensation in Spanish firms. This research uses data available in annual reports that the CNMV has required to Spanish listed companies between 2013 and 2017 (IAGCs and IARCs). These reports disclose executive compensation plans in great detail and they also provide information about the private investment of the CEO in company’s shares (an investment the CEO could dispose of at any time without any restriction).

Besides data availability, it is important to consider that Spain is one of the main economies in the world, which increases the relevance of studying executive compensation in Spanish firms. In this regard, Spain is the 13<sup>th</sup> world economy, having a GDP near to 110 billions of euros<sup>7</sup>. Likewise, several Spanish companies play a strong international role in traditional sectors such as construction or infrastructure (Gallardo & Villacorta, 2016).

---

<sup>7</sup> Ministry of Foreign Affairs, European Union and Cooperation of Spain (<http://www.exteriores.gob.es/Portal/en/PoliticaExteriorCooperacion/GlobalizacionOportunidadesRiesgos/Paginas/EspEnElMundoGlobalizado.aspx>).

In addition to the analysis of executive compensation, this Dissertation has also developed an innovative financial model to value employee stock options. To the best of my knowledge, the literature so far has used the Black-Scholes-Merton model to value employee stock options. However, the Black-Scholes-Merton model does not provide an accurate valuation of these options because it does not take into account that employee stock options can be exercised over a period of time (i.e., they are Bermudan and not European) and that employees tend to exercise stock options earlier than it would be optimal for a common traded option.

The research of this Dissertation contributes to the literature in three different areas of analysis. In particular, this Dissertation:

- i. Provides a detailed analysis of executive compensation and incentives in Spanish firms, and performs an international comparison in this regard.
- ii. Studies the relationship between executive compensation and shareholder value creation in Spanish firms.

I highlight that this Dissertation analyzes the relationship between variables without cause-effect implications due to the lack of a valid identification instrument.

- iii. Develops a financial model for the valuation of employee stock options, considering that these options can be exercised over a period of time and incorporating their early exercise character.

The remainder of this Dissertation is organized as follows:

- Section 2 covers the literature review.
- Section 3 details the interest and contributions of this research.
- Section 4 describes the research question to be analyzed.
- Section 5 describes the data that has been used in this research.
- Section 6 explains the methodology employed in each of the three areas of analysis of this research.
- Section 7 presents the results and discussion regarding CEO compensation plan design in Spanish firms.
- Section 8 presents the results and discussion regarding the relation between CEO incentives and firm performance.
- Section 9 presents the results and discussion regarding the Employee Stock Option Valuation Model (ESOV) developed in this research.
- Section 10 summarizes the conclusions reached in this research in each of the three areas of analysis.
- Section 11 refers to the limitations of the analysis and the aspects that could be covered in future research.



## 1.2 Introduction (Spanish Version, *Introducción*)

El colapso de los precios de la vivienda en EE.UU. entre 2007 y 2009 implicó la quiebra (o casi la quiebra) de varias instituciones financieras y dio lugar a una crisis que se extendió por todo el mundo (Saadi, 2020). Desde que estalló esta crisis financiera, ha habido un gran debate público sobre la regulación de la compensación de los directivos (Gete & Gomez, 2017).

En particular, el interés de “*académicos, inversores, legisladores y el público general*” por las prácticas de compensación de ejecutivos ha crecido cada vez más (Cavaco et al., 2000, p. 244). La siguiente declaración hecha por el presidente Barack Obama en 2010 refleja la preocupación existente con respecto a la retribución de los ejecutivos:

*“Esta crisis económica comenzó como una crisis financiera, cuando los bancos y las instituciones financieras asumieron riesgos enormes e imprudentes en busca de ganancias rápidas y bonus inmensos”* (Presidente Barack Obama, 2010<sup>8</sup>).

La preocupación acerca de la remuneración de los ejecutivos está asociada a si los niveles de remuneración de los ejecutivos son excesivos y si los incentivos de los ejecutivos están relacionados con el desempeño de la empresa. El análisis de estos aspectos sería de utilidad para el público en general, los organismos reguladores, los accionistas y los profesionales del gobierno corporativo.

---

<sup>8</sup> <https://obamawhitehouse.archives.gov/the-press-office/remarks-president-financial-reform>.

Durante el desarrollo de esta investigación, tuve la oportunidad de reunirme con los representantes de la Comisión Nacional del Mercado de Valores (CNMV) el 10 de enero de 2019 y el 11 de octubre de 2019. En estas reuniones, los representantes de la CNMV expresaron su preocupación acerca del diseño de los planes de compensación para ejecutivos en las empresas españolas y acerca de si los ejecutivos tienen suficientes incentivos para mejorar el rendimiento de sus empresas.

Conforme establecieron Jensen y Meckling (1976), la remuneración constituye un instrumento crítico para alinear los intereses de los ejecutivos con los intereses de los accionistas y, por tanto, para reducir el problema de agencia que surge de la separación de la gestión y la propiedad empresarial.

En este sentido, el tamaño cada vez mayor de las corporaciones dificulta la supervisión de las actividades de gestión por parte de los accionistas (Markarian et al., 2007), lo que aumenta la importancia de proporcionar incentivos para alinear el interés de los ejecutivos con los intereses de los accionistas.

De esta manera, la remuneración de los ejecutivos puede verse como una solución al problema de agencia generado por la separación de la gestión y la propiedad. Sin embargo, la remuneración de los ejecutivos también puede verse como parte de este problema de agencia, dando lugar a una remuneración excesiva. Esta última perspectiva sostiene que la remuneración de los ejecutivos representa un mecanismo para extraer rentas de la empresa y que la remuneración de los ejecutivos está por encima de los niveles óptimos.

La investigación sobre la remuneración de ejecutivos se ha visto limitada por la falta de información disponible sobre los planes de compensación. Las empresas y los ejecutivos se muestran reacios a revelar información sobre los esquemas de remuneración. Por lo tanto, esta información solo está disponible públicamente cuando así lo requiere la regulación.

Debido a la falta de información disponible en otros países diferentes a Estados Unidos, la gran mayoría de las investigaciones sobre remuneración de ejecutivos se ha realizado con datos de empresas estadounidenses (Baixauli & Sanchez-Marin, 2011), utilizando frecuentemente la base de datos Compustat ExecuComp. Esto implica que haya una *“escasez de estudios internacionales sobre retribución de ejecutivos”* como señalan Boyd et al. (2012, pág.516).

La investigación de esta Tesis Doctoral contribuye a cubrir la falta de estudios sobre la retribución de ejecutivos en otros países diferentes a Estados Unidos. En este sentido, la presente Tesis Doctoral efectúa su estudio sobre empresas españolas, utilizando los datos disponibles en los informes anuales que la CNMV ha exigido a las sociedades cotizadas españolas entre 2013 y 2017 (IAGC y IARC). Estos informes contienen información muy detallada sobre los planes de compensación y también brindan información sobre la inversión privada del CEO en acciones de la empresa (una inversión de la que el CEO podría disponer en cualquier momento sin ninguna restricción).

Unido a la disponibilidad de datos, es importante tener en cuenta que España es una de las principales economías del mundo, lo que aumenta la relevancia de estudiar la retribución de los ejecutivos en las empresas españolas. En este sentido, España es la decimotercera economía mundial, con un PIB cercano a los 110 mil millones de euros. Asimismo, varias empresas españolas desempeñan un fuerte papel internacional en sectores tradicionales como la construcción o las infraestructuras (Gallardo & Villacorta, 2016).

Además del análisis de la remuneración de los ejecutivos, esta Tesis Doctoral también ha desarrollado un modelo financiero innovador para valorar las opciones sobre acciones de los empleados. Hasta dónde llega mi conocimiento, la literatura ha utilizado el modelo Black-Scholes-Merton para valorar las opciones sobre acciones de los empleados. Sin embargo, el modelo Black-Scholes-Merton no proporciona una valoración precisa de estas opciones porque no tiene en cuenta que las opciones sobre acciones de los empleados pueden ejercerse durante un período de tiempo (es decir, son opciones Bermuda y no europeas) y que los empleados tienden a ejercer las opciones sobre acciones antes de lo que sería óptimo si se tratase de una opción cotizada común.

La investigación de esta Tesis Doctoral contribuirá a la literatura en tres áreas de análisis diferentes. En particular, esta Tesis Doctoral:

- i. Proporciona un análisis detallado de la remuneración e incentivos de los ejecutivos en las empresas españolas y realiza una comparativa internacional a este respecto.
- ii. Estudia la relación entre la retribución de los ejecutivos y la creación de valor para el accionista en las empresas españolas.

Me gustaría destacar que esta Tesis Doctoral analiza la relación entre variables, sin implicaciones de causa-efecto debido a la falta de un instrumento válido de identificación.

- iii. Desarrolla un modelo financiero para la valoración de las opciones sobre acciones de los empleados, considerando que estas opciones pueden ejercerse durante un período de tiempo determinado e incorporando su ejecución temprana.

El resto de esta Tesis Doctoral está organizado de la siguiente manera:

- La Sección 2 realiza la revisión de la literatura.
- La Sección 3 detalla el interés y las contribuciones de esta Tesis Doctoral.
- La Sección 4 describe las preguntas de investigación.
- La Sección 5 describe los datos que se han utilizado en la investigación.

- La Sección 6 explica la metodología empleada en cada una de las tres áreas de análisis de esta Tesis Doctoral.
- La Sección 7 presenta y analiza los resultados sobre el diseño de los planes de compensación de los CEOs en las empresas españolas.
- La Sección 8 presenta y analiza los resultados sobre la relación entre los incentivos de los ejecutivos y el rendimiento de las empresas.
- La Sección 9 presenta y analiza los resultados del Modelo de Valoración de Opciones sobre Acciones para Empleados (ESOVM) que ha sido desarrollado en la presente Tesis Doctoral.
- La Sección 10 presenta las conclusiones alcanzadas en cada una de las áreas de análisis de esta Tesis Doctoral.
- La Sección 11 se refiere a las limitaciones del análisis realizado en esta Tesis Doctoral y a los aspectos que podrían ser analizados en investigaciones futuras.

## 2 Literature Review

### 2.1 The Agency Problem caused by the Separation of Management and Property

When executives become the managers of other's people money, *"it cannot well be expected that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own"* (Adam Smith, 1796, p. 574-575). This is probably the first acknowledgement of the problem generated by the separation between property and management.

In modern corporations, management and property are usually separated. While in office, executives can act at their discretion regarding the management of the company (Berle & Means, 1931). The separation between management and property leads to an agency relationship between executives and shareholders (Ross, 1973; Jensen and Meckling, 1976; Fama, 1980; Fama and Jensen, 1983; Eisenhardt, 1989; Panda and Leepsa, 2017; Payne & Petrenko, 2019).

An agency relationship consists in *"a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent"* (Jensen & Meckling, 1976, p. 308). In this way, executive contracts can be viewed as contracts where:

- i. Shareholders engage with executive to perform the management of the company;  
and
- ii. Shareholder delegate the control of the corporations (i.e., managerial decisions)  
to executives.

Hence, there is an agency relationship between executives and shareholders derived from the separation between property and management. This separation facilitates that investors diversify their investments among different companies in line with optimal portfolio theory (Fama, 1980). In this way, the separation between property and control represents “*an efficient form of economic organization*” (Fama, 1980, p. 289).

In the described agency relationship, executives act as agents of shareholders, who are the principals. “*If both parties to the relationship are utility maximizers, there is good reason to believe that the agent will not always act in the best interests of the principal*” (Jensen & Meckling, 1976, p. 308). This divergence of interests represents the “*cornerstone of agency theory*” (Hill & Jones, 1992, p. 132).

This divergence of interests lead to the two main problems that are addressed by the agency theory (Eisenhardt, 1989):

- i. The first problem arises when:
  - a. the goals and objectives of the principal conflict with the goals and objectives of the agent, and

- b. the monitoring of managerial activity is difficult or expensive.
- ii. The second problem arises when the principal and the agent have different risk appetite.

An example of conflicting interests between shareholders and CEOs goals is that CEOs seek to increase company size to increase their compensation (bigger companies usually pay a higher compensation), despite this size increase is achieved through unprofitable expansion (Murphy, 2013). In the same line, Jensen (1989, p. 127) states that executives “*have many incentives to expand company size beyond that which maximizes shareholder wealth*”, being compensation “*one of the most important incentives*” in this regard.

Bebchuck & Fried (2006) also argue that executives may increase firm size through mergers and acquisitions that do not maximize shareholder value to increase their compensation. And Bliss et al. (2001) found that CEO increased their compensation even after mergers that destroyed shareholder value, which is consistent with the argument that executives are incentivized to increase company size despite this destroys shareholder value.

The divergence of interests cause suboptimal outcomes due to (Eisenhardt, 1989):

- i. **Moral hazard**, which refers to lack of effort from executives (i.e., time and resources dedicated to pursue personal goals).

- ii. **Adverse selection**, which refers to managers misrepresenting their skills and capabilities (i.e., managers may misrepresent their skills and capabilities both during their selection process and during the development of their work while the principal may not be able to verify those skills and capabilities).

The divergence of the interests of executives with the interests of shareholders generates the following agency costs:

- i. *“Monitoring expenditures by the principal”* (Jensen & Meckling, 1976, p. 308). These costs include not only measuring and observing costs, but also *“efforts on the part of the principal [shareholders] to ‘control’ the behavior of the agent through budget restrictions, compensation policies, operating rules, etc.”* (Jensen & Meckling, 1976, p. 308).
- ii. *“Bonding expenditures by the agent”* (Jensen & Meckling, 1976, p. 308). These costs correspond to resources that are expended *“to guarantee that he will not take certain actions which would harm the principal or to ensure that the principal will be compensated if he does take such actions”* (Jensen & Meckling, 1976, p. 308). These costs are expended by the agent, such as contractual guarantees or limitations to managerial power.
- iii. *“Residual loss”* (Jensen & Meckling, 1976, p. 308). The residual loss is the *“dollar equivalent of the reduction in welfare experienced by the principal due to*

*[...] the divergence between the agent's decisions and those decisions which would maximize the welfare of the principal" (Jensen & Meckling, 1976, p. 308).*

The literature has identified several sources of agency costs, for example: *"the costs of recruitment, adverse selection, specifying and discerning preferences, providing incentives, moral hazard, shirking, stealing, self-dealing, corruption, monitoring and policing, self-regulation, bonding and insurance, agents who oversee agents who oversee agents, as well as failures in these costly corrective devices"* (Shapiro, 2005, p. 281).

Agency costs are also increased by measures taken by principals, agents, or both, such as *"procedures, decision rules, protocols, or formularies to limit agent discretion"* (Shapiro, 2005, p. 281).

The reduction of agency costs constitutes a key element of the agency theory (Payne and Petrenko, 2019). Agency costs may be reduced by aligning the interests of executives with the interests of shareholders (Shapiro, 2015).

If the interests of executives were perfectly aligned with the interests of shareholders, executives would always make the best decisions from the shareholders viewpoint (Jensen & Meckling, 1976). However, reaching this perfect alignment is almost impossible, as it has been recognized in the literature (Jensen & Meckling, 1976; Bebchuk et al., 2002).

The main mechanisms to align the interests of shareholders and executives are (Hill & Jones, 1992):

- i. Providing compensation incentives to executives.
- ii. Monitoring the performance of executives.

Therefore, executive compensation incentives represents a mechanism to align the interests of executives with the interests of shareholders (Jensen & Meckling, 1976; Hill & Jones, 1992). In this regard, the empirical evidence shows that compensation incentives have actually contributed to align the interests of executives with the interests of shareholders (Frydman & Saks, 2010).

At the same time, executive compensation incentives also represent a mechanism that can be used to skim profits by executives (Geiler & Renneboog, 2011). This approach has also received support in the literature (Yermack, 1995; Bebchuk et al., 2002; Bebchuk & Fried, 2003).

Therefore, executive compensation incentives can be viewed from:

- i. An optimal contracting perspective, where compensation incentives are considered a solution to the agency problem.
- ii. A managerial power perspective, where compensation incentives are considered an agency problem.

## 2.2 Main Theoretical Wings: Optimal Contracting Approach and Managerial Power Approach

In the literature on executive compensation, there are two main theoretical wings (Bebchuk et al., 2002; Murphy, 2002; Frydman & Jenter, 2010; Melis and Rombi, 2018).

- i. The optimal contracting approach.
- ii. The managerial power approach.

The **optimal contracting approach** argues that executive compensation contracts minimize agency costs and, hence, maximize shareholder value (Bebchuk et al., 2002). Under the optimal contracting approach, the Board of Directors act on the best interests of shareholders and negotiate compensation contracts with executive on an arms-length transaction basis (Dorff, 2005). As a result, compensation incentives constitutes a mechanism to optimally align the interests of executives with the interests of shareholders (Dorff, 2005). Under this view, compensation incentives represents a solution to the agency problem caused by the separation of ownership and control.

Compensation incentives play a key role under the optimal contracting approach since it constitutes the mechanism to minimize agency costs (Dorff, 2005). In line with this, the Board of Directors also contribute to minimize agency costs by setting a set of cost-effective compensation incentives for executives (Bebchuk & Fried, 2003). Ultimately,

the provision of these efficient incentives contributes to maximize shareholder value (Bebchuk and Fried, 2003).

The optimal design of executive compensation incentives depend on the characteristics of the company (Jensen and Meckling, 1976; Demsetz & Lehn, 1985), but also on the characteristics of the executive (Frydman & Jenter, 2010). In this way, there is not a common set of incentives that should be applied by every company. Instead, the optimal set of incentives depends on both the company and the executive at consideration.

Oppositely to the optimal contracting approach, the **managerial power approach** argues that executives use their power over the Board of Directors to increase their compensation and, hence, to extract rents from the company (Bebchuk et al., 2002). *“Under [...] the managerial power approach, executive compensation is viewed not only as a potential instrument for addressing the agency problem but also as part of the agency problem itself”* (Bebchuk & Fried, 2003, p. 72).

Consequently, the Board of Directors does no longer act in the sole benefit of shareholders. Instead, the Board of Directors is influenced by executives to approve compensation schemes that provide payments levels higher than optimal (Chen, 2004). In this way, the Board of Directors become part of the agency problem.

**Figure 15. Optimal contracting approach and managerial power approach**

Optimal Contracting Approach	Managerial Power Approach
<ul style="list-style-type: none"> <li>• Compensation incentives minimize agency costs and maximize shareholder value.</li> <li>• Compensation incentives are part of the solution to the agency problem.</li> <li>• Board of Directors contribute to minimize agency costs by setting a set of cost-effective compensation incentives.</li> </ul>	<ul style="list-style-type: none"> <li>• Executives use their power over the Board of Directors to increase their compensation and, hence, to extract rents from the company.</li> <li>• Compensation incentives are part of the agency problem.</li> <li>• Board of Directors are influenced by executives to approve compensation schemes that provide payment levels higher than optimal levels.</li> </ul>

*Source: literature review*

The literature has carried out a wide range of different studies to find evidence in support or against the optimal contracting approach and the managerial power approach. All in all, these two approaches have received considerable support and have been criticized from different perspectives.

Core & Guay (1999) concluded that companies grant equity incentives in a manner consistent with economic theory, hence, supporting the optimal contracting approach. Acharya et al. (2000) studied the resetting of the strike price in executive stock options, concluding that this resetting was frequently optimal and, also, finding support for the optimal contracting approach.

Bebchuk et al. (2002) argues that the lack of relative performance measures in the design of CEO compensation plans implies that CEOs are paid for luck (they receive incentives due to industry performance instead of firm performance) and that this evidence is not consistent with the optimal contracting approach. However, Feriozzi (2011) develops a

model that includes pay for luck (i.e., pay for industry performance) and that is consistent with the optimal contracting approach.

Murphy (2002) found that the increase in executive pay during the 1990s happened with increasingly independent Board of Directors, which constitutes evidence against the managerial power approach. Murphy & Zabožnik (2004) highlighted that Boards of Directors are becoming increasingly independent, which also constitutes evidence against the managerial power approach.

One of the limitations of the optimal contracting approach consists in assuming that Boards of Directors act in the best interest of shareholders. In this regard, same as executives, Boards of Directors may act in their own best interest and not in the best interest of shareholders (Bebchuk & Fried, 2003).

### **2.3 Literature Review on CEO Compensation in other Countries different from the US**

The literature on executive compensation in other countries different from the US has been limited by the lack of available data. Many times, this literature has used assumptions to overcome the lack of available data. The review of the literature on CEO compensation in other countries different from the US is set out as follows.

Canyon & Schwalbach (2000) analyzed executive compensation in UK and Germany, concluding that compensation packages were significantly different between these two countries.

Randoy & Nielsen (2002) focused their research on Norway and Sweden, where the authors did not find any relationship between CEO compensation and firm performance. In their paper, the authors mention that companies did not consistently report the details of CEO compensation, which represents a limitation of their research.

Firth et al. (2006) extended the research by studying CEO compensation in China's listed firms. The authors identified that companies that were participated by State bureaucratic agencies had lower performance incentives than the other companies.

Kato & Kubo (2006) used data provided by a consulting firm to study executive compensation in Japan. In particular, the consulting firm provided data on CEO's salary and bonus for 51 Japanese firms. If the consulting firm would not have provided this data, this study could not have been performed. In this study, the authors found a positive relationship between CEO compensation and firm performance, measured as shareholder value creation.

Mitsudome et al. (2008, p. 606) argue that *"almost all of the empirical research is conducted in a US setting"* due to information disclosure requirements by the SEC. The authors extended the research to the Japanese setting, finding a positive relationship between executive compensation and firm performance.

Ozkan (2011) mentions that the research on executive compensation in the UK is fairly limited in comparison with the research in the US. The author studied the relationship between CEO wealth and firm performance in the UK, finding a weak association.

Kazan (2016) extended the research on executive compensation to the Scandinavian countries of Denmark, Finland, Norway and Sweden. The author found no relationship between CEO compensation and firm performance. The author also mentions that the research is limited by the lack of available information (i.e., some companies did not disclose enough information).

Smirnova & Zaveritiaeva (2017) studied the relationship between CEO compensation and firm performance in European firms between 2009 and 2013, finding a positive relationship between these variables. The authors mention that their study focused on cash compensation and that it did not take into account share based compensation. The authors point out that incorporating share based compensation into the analysis represents an area for future research.

Maranho & Leal (2018) performed a meta-analysis of executive compensation in Latin America countries, reviewing corporate governance best practice and the relationship between these practices and firm performance. In addition, Maranho & Leal (2018, p. 199) mention that *“the Latin American literature that examines the relationship between compensation and performance is not abundant, due in part to the relative lack of*

*information.*” We find again information constraints in the study of executive compensation in other international environments different from the US.

Boyd et al. (2012, p. 516) pointed out the “*scarcity of international studies of executive compensation*”, highlighting that current theories “*are almost exclusively developed in the US context.*” In this regard, Boyd et al. (2012, p. 516) “*urge researchers to conduct more international research.*”

In Spain, the literature has been mainly focused on the analysis of corporate governance mechanisms and ownership. In this way, Baixauli-Soler & Sanchez-Marin (2015, p.136) found that “*boards monitoring are only effective when the dominant shareholders who control the company are individuals or families without links to other companies.*” In this regard, information of executive compensation in Spanish firms was very limited until 2013. As described in Appendix IV, Spanish regulation has required companies to disclose executive compensation since 2013.

As far as I know, Gomez (2019) was the first study performed using the Spanish data that is available since 2013 in the IARCs and IAGCs. This Dissertation extends the research developed by Gomez (2019), considering the information included in the body of IARCs.

In conclusion, the research on executive compensation has been mainly focused on the US, with a “*scarcity of international studies of executive compensation*” as mentioned by Boyd et al. (2012, p. 516). The present research uses the highly detailed data on executive compensation that is available in Spain since 2013. The disclosure of executive

compensation information in Spain is much higher than this disclosure in other countries, which constitutes a key opportunity to extend the research on executive compensation to other international environments by studying executive compensation in Spanish firms.

## 2.4 Literature Review on ESG Objectives

The performance of companies regarding ESG (environmental, social and corporate governance objectives) has become increasingly important in recent years (Jha & Cox, 2015; Khan, 2019). Investors, employees, regulators and the society as a whole are paying an increasing attention to ESG performance.

Following Yoon et al. (2018, p.3), ESG objectives can be defined as follows:

- i. **Environmental objectives:** they refer to *“firm’s effort to reduce resource consumption and emissions”* (Yoon et al., 2018, p. 3). These objectives include issues such as *“climate change, energy and water use, carbon emissions”* (Galbreath et al., 2013, p. 530).
- ii. **Social objectives:** they refer to *“respecting human rights, the quality of employment, the responsibility of the product, and community relations”* (Yoon et al., 2018, p. 3). These objectives include issues such as *“fair trade principles, human rights, product safety, gender equality, health and safety”* (Galbreath et al., 2013, p. 530).
- iii. **Corporate governance objective:** they refer to *“the rights and responsibilities of the management of a firm (governance structure)”* (Yoon et al., 2018, p. 3). These objectives include issues such as *“board independence, corruption and*

*bribery, reporting and disclosure, shareholder protection” (Galbreath et al., 2013, p. 530).*

The concern about ESG objectives arose in the 1970s (Galbreath, 2013; Friede et al., 2015), when a group of investors considered ESG performance to select their investments (Richardson, 2009). Since then, public concern regarding ESG performance has become increasingly important leading to the creation of institutions focused on ESG objectives such as the United Nations Environmental Program, the Coalition from Environmentally Responsible Economies (Galbreath, 2013).

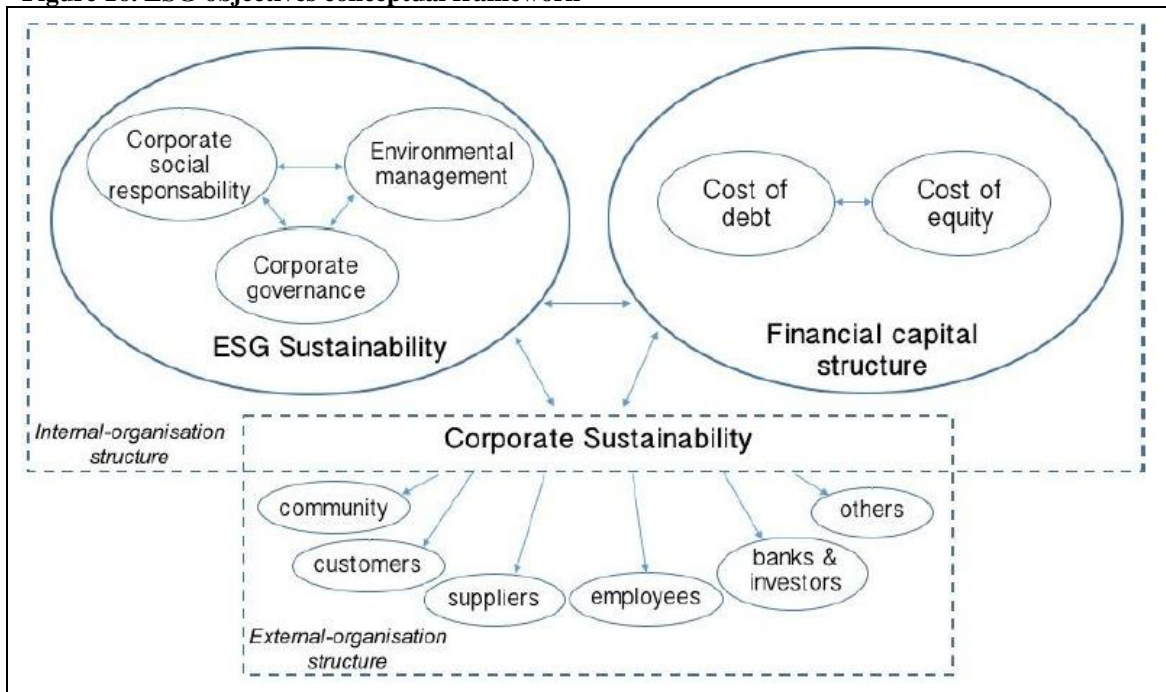
Gender equality is also an important area within ESG objectives. Governments are becoming increasingly concerned about gender equality, leading to the creation of organizational bodies (i.e., the Spanish Ministry for Equality) to promote gender equality in different areas, including the workplace. As a result, new rules and regulations have been issued to reduce gender inequality at the workplace, especially in leadership positions. Besides rules and regulation, institutional pressures are also contributing to reduce gender inequality in leadership positions at the workplace (Bonet et al., 2020).

In addition to the creation of institutions, several standards and guidelines have been published regarding ESG performance. The most relevant ones are the Principles for Responsible Investment, published by the United Nations, and the Global Reporting Initiative Principles, published by the Global Reporting Initiative (Galbreath, 2013).

Governments have also issued regulations related to ESG performance, such as EU Directive 2003/87/EC, which established the EU Emissions Trading System. The EU has also issued Directive 2014/95/EU, which is “aimed at promoting sustainability disclosure, increasing reporting quality, and providing a more reliable picture of organizational politics, results, and risks” (Ferrer et al., 2020).

Cantino et al. (2017) provide a conceptual framework for the analysis of ESG objectives. According to this framework, ESG objectives affect not only the financial cost of capital of the firm, but also the stakeholders of the firm. The following figure shows this conceptual framework:

**Figure 16. ESG objectives conceptual framework**



Source: Cantino et al. (2017, p. 118)

The literature on ESG thoroughly analyzed the relationship between ESG performance and financial performance. In this regard, the majority of the research has found a positive relation between ESG performance and financial performance (Friede et al., 2015).

It is commonly accepted that one of the reasons for this positive relation between ESG performance and financial performance is the contribution of ESG performance to reduce the cost of capital (Shaut & Pasquini-Descomps, 2015).

In particular, the literature has found a negative relation between ESG performance and the cost of equity, while additional research is necessary to analyze the relation between ESG performance and the cost of debt (Cantino et al, 2017). Indeed, the analysis of ESG performance should be incorporated into the analysis of a firm creditworthiness (Devalle et al., 2017; Inderst & Stewart, 2018).

The literature on ESG objectives has also found a positive impact of ESG performance on the reputation of the firm in what is called the ESG advertising effect (Shaut & Pasquini-Descomps, 2015). By improving the reputation of the firm, ESG performance has also an impact on the stakeholders of the firm, such as customers, suppliers and employees. For example, customers are more willing to acquire products from firms that are socially responsible, and employees are more willing to work for these firms too.

## **2.5 Literature Review on CEO Compensation and Firm Performance**

As exposed in Section 2.1, the agency problems created by the separation of ownership and control are based on (Eisenhardt, 1989):

- i. Executives and shareholders having different goals.
- ii. Executives and shareholders having different risk appetite.

In this Section we are going to study the literature related to the first problem: executives and shareholders having different goals.

According to agency theory, executives will receive compensation incentives to align their goals with those of shareholders (Jensen & Murphy, 1990). In addition, executive compensation also serves to attract and retain talent (Fuchs & Sato, 2009). Sole (2013) also points out that the attraction and retention of talent constitutes one of the main objectives of compensation.

Jensen & Murphy (1990) have evaluated the alignment between executives' and shareholders' goals by measuring how much CEO compensation changes for each euro change in shareholder wealth, finding that CEOs earned \$3.25 for each \$1,000 increase in shareholder wealth. Based on this finding, Jensen & Murphy (1990) argued that there was a weak link between CEO compensation and shareholder wealth against the prediction of the optimal contracting approach.

Hall & Liebman (1998) pointed out that the study of Jensen & Murphy (1990) took place before the widespread of stock options and restricted shares. Using a new set of data for the period 1980-1994, Hall & Liebman (1998) found a strong relationship between executive compensation and shareholder wealth creation.

The literature has developed three sensitivity measures of executive compensation to shareholder value creation:

- i. The first measure (M1) was used by Jensen and Murphy (1990) and it determines the euro amount increase in executive compensation for each one thousand euro increase in shareholder value. The calculation formula of this measure is:

$$M1 = \frac{\partial C}{\partial V \times 1,000} \quad (1)$$

- ii. The second measure (M2) was used by Hall and Liebman (1998) and it determines the euro amount increase in executive compensation for each percentage point increase in shareholder value. The calculation formula of this measure is:

$$M2 = \frac{\partial C}{\partial V / V} \quad (2)$$

- iii. The third measure (M3) represents an elasticity calculation of executive compensation to shareholder value creation. This measure has been used by several authors (i.e., Hall and Liebman, 1998; Gomez, 2019) and it determines the

percentage increase in executive compensation for each percentage point increase in shareholder value. The calculation formula of this measure is:

$$M3 = \frac{\partial c/c}{\partial v/v} \quad (3)$$

Most of the literature regarding the alignment of executive compensation and firm performance has been focused on US data (Gomez, 2019), mainly due to the availability of information. As far as I know, Gomez (2019) was the first study performed using the Spanish data that is available since 2013.

Gomez (2019) concluded that CEOs' compensation of Spanish companies have very little exposure to shareholder value creation. This Dissertation extends the research initiated by Gomez (2019) on Spanish firms by:

- i. Incorporating the information available in the main body of the IARCs, since Gomez (2019) was focused on the data available in the summary tables of the IARCs. As per the analysis developed in Section 5.1, the main body of the IARCs have information showing that companies do not accurately report the summary tables in the IARCs.

As I expose in Section 0, gathering and processing the data of the main body of IARCs requires extensive work due to the extension of the documentation to review and the way the information is presented.

- ii. Incorporating information regarding the private portfolio of shares hold by the CEOs. IAGCs contain information regarding CEOs' share holdings in the firm at consideration. The private portfolio of companies' shares represents a relevant source of incentives for CEOs.

I would like to highlight the lack of information regarding CEOs' share holdings in other countries, which makes the case of Spain interesting for the analysis of executive compensation.

- iii. Valuing employee stock options and restricted shares with innovative financial models. As exposed in Section 4.3, the scope of this Dissertation encompasses the development of financial models to accurately value executive stock options and restricted shares.

## **2.6 Literature Review on the Valuation of Employee Stock Options**

Companies have granted employee stock options under the rationale that they would incentive executives to increase the stock price (Huddart, 1994).

The literature has long recognized that the value of employee stock options that can be exercised during a period of time is different from the value obtained using the Black-Scholes-Merton model. The reason behind consists in employee stock options being exercised earlier than it would be optimal according to the Black-Scholes-Merton approach.

Despite early exercise of employee stock options is not optimal from a market perspective, it can be optimal from the executive's perspective (Malmendier & Fate, 2005). In particular, Malmendier & Fate (2005, p. 2663) mention the “*overexposure of typical CEOs to the idiosyncratic risk of their firms*” and conclude that “*because this under-diversification, risk-averse CEOs should exercise their options early given a sufficiently high stock price.*”

Hall & Murphy (2002, p. 8) also highlight that “*executives are inherently undiversified, with their physical as well as human capital invested disproportionately in their company.*” This lack of diversification implies that it can be optimal for executives to exercise their options earlier than indicated by the Black-Scholes-Merton approach.

Grant, Markarian & Parbonetti (2009) also mention that CEOs are not diversified investors. Consequently, early exercising stock options may be optimal for CEOs considering this lack of diversification.

Huddart (1994) concludes that early exercise of employee stock options depend on the characteristics of the employee, such as wealth or risk aversion. Huddart (1994) highlights that an important characteristic of employee stock options is that they cannot be sold, that is to say, they have no liquidity.

The literature has also considered the possibility that employees hedge their exposure to stock options, however, there are several limitations to the actual implementation of this

hedge as far as executives face wealth, regulatory and firm limitations (Hemmer et al., 1996). In this regard:

- i. Wealth limitations are associated with the executive having enough wealth to acquire the hedging products.
- ii. Regulatory limitations are associated with regulations that prohibit inside trading.
- iii. Firm limitations are associated with specific contractual provisions that restrict the hedging of options by executives.

The hedging restrictions impose on executives imply that employee stock options are more difficult to value than ordinary American stock options (Carpenter, 1998). Carpenter (1998) also highlights that the research on the early exercise of employee stock options has been limited by the data available on the characteristics of these options (i.e., strike price, time to maturity). Core & Guay (2002) also argue that the limitation on available data about employee stock options has been an obstacle for the research on this field. In addition, Core & Guay (2002) mentions that the limitation and cost of gathering accurate data regarding employee stock option has caused that many research studies use proxies to estimate employee stock option values.

The early exercise of employee stock options implies that employees sacrifice part of the Black-Scholes-Merton option value (Huddart & Lang, 1996). Huddart & Lang (1996)

also found that the exercise of employee stock options depends on the evolution of the stock price.

In this line, Tian (2001) argue that employee stock options should not be valued using the Black-Scholes-Merton model as far as this model does not provide an accurate value of employee stock options. Tian (2001) also mentions that research on employee stock options has been mainly focused on the sensitivity of pay to performance rather than on the correct valuation of these options.

Hall & Murphy (2002) differentiate between employee stock option values for the company and for the executives. These authors argue that employee stock options represent a higher cost for the company than the value they provide for employees. Implicitly, Hall & Murphy (2002) also argue that employee stock option values are lower than the values obtained using the Black-Scholes-Merton model. Hall & Murphy (2002) also highlights the limitation on available data regarding employee stock options as far as the characteristics of these options are not completely disclose on proxy and financial statements.

Acknowledging that the Black-Scholes-Merton model does not constitute a good approach to value employee stock options, Hull & White (2004) propose a new model that is based on the level of the stock price in relation to the strike price. The model proposed by Hull & White (2004) is presented from a theoretical perspective, without any practical development regarding the implementation of this model. In this way, Hull &

White (2004) present a theoretical approach that requires additional research and development to be implemented.

Bettis et al. (2005) studied the early exercise behavior of employee stock options. On a research based on data between 1996 and 2002, Bettis et al. (2005) concluded that the early exercise of employee stock options implies that employees sacrifice 10% of the Black-Scholes-Merton option value. Despite the study of Bettis et al. (2005) provides the value sacrifice by the early exercise, the study leaves for future research the development of valuation models based on this finding.

Chance & Yang (2007, p. 272) highlights the importance of the valuation of employee stock options, mentioning that it represents “*one of the most controversial issues in the corporate world today*”. Chance & Yang (2007) also states that the literature has widely recognized that the Black-Scholes-Merton model significantly overestimate the value of employee stock options.

## **2.7 Literature Review on Stock Option Valuation Models**

In this Section I present a review on the main approaches that can be used to value stock options, which can be divided into analytical models, lattice models and Monte Carlo simulations (Broadie & Detemple, 2004).

Analytical models provide close-end formulas to value stock options (Di Persio et al., 2019). The Black-Scholes-Merton model is the most representative analytical model. The

Black-Scholes-Merton model “starts from the premise that the underlying asset price  $S$  follows a geometric Brownian motion process” (Broadie & Detemple, 2004):

$$\frac{dS_t}{S_t} = (\mu - \delta)dt + \sigma dW_t \quad (4)$$

where “ $\mu$ ,  $\delta$  and  $\sigma$  are constants, which represent the expected (total) return on the asset, the dividend rate, and the return volatility, respectively” (Broadie & Detemple, 2004).

Considering that  $f$  is the value of a call option, then the value of  $f$  will depend on  $S$  and  $t$ , from which it derives the following equation (Hull, 2015):

$$df = \left( \frac{\partial f}{\partial S} \mu S + \frac{\partial f}{\partial t} + \frac{1}{2} \frac{\partial^2 f}{\partial S^2} \sigma^2 S^2 \right) dt + \frac{\partial f}{\partial S} \sigma S dz \quad (5)$$

Solving the previous differential equation, the Black-Scholes-Merton model establishes that the value of a call option can be calculated as follows:

$$C = S e^{-q\tau} N(d_1) - e^{-r\tau} K N(d_2) \quad (6)$$

where:

$$d_1 = \frac{\ln(S/K) + \left( r - q + \frac{\sigma^2}{2} \right) \tau}{\sigma \sqrt{\tau}}$$

$$d_2 = d_1 - \sigma \sqrt{\tau}$$

The Black-Scholes-Merton is developed under certain assumption regarding interest rate, transactions costs and borrowing capability. In particular, the assumptions of the Black-Scholes-Merton model are set out as follows:

- “(a) The short-term interest rate is known and is constant through time.*
- (b) The stock price follows a random walk in continuous time with a variance rate proportional to the square of the stock price. Thus the distribution of possible stock prices at the end of any finite interval is lognormal. The variance rate of the return on the stock is constant.*
- (c) The stock pays no dividends or other distributions.*
- (d) The option is ‘European,’ that is, it can only be exercised at maturity.*
- (e) There are no transaction costs in buying or selling the stock or the option.*
- (f) It is possible to borrow any fraction of the price of a security to buy it or to hold it, at the short-term interest rate.*
- (g) There are no penalties to short selling. A seller who does not own a security will simply accept the price of the security from a buyer, and will agree to settle with the buyer on some future date by paying him an amount equal to the price of the security on that date” (Black & Scholes, 1973).*

The Black-Scholes-Merton model supposed a major breakthrough in the valuation of stock options (Hull, 2015). The model did not only have an impact on the theoretical valuation of stock options, but it also had a practical impact. At the moment, the Black-Scholes-Merton model is accepted by the main financial institutions and regulators for valuing stock options.

The only parameter in the Black-Scholes-Merton model that cannot be observed in market data is volatility. In this regard, there are two alternatives to estimate the volatility parameter:

- i. Using the historical volatility, which is “*the standard deviation of the annual logarithmic returns of an instrument*” (Taneja et al. 2019, p. 110005-1). This measure is backward-looking and implicitly assumes that the volatility of the stock in the future will be the same as the volatility it had in the past.
- ii. Using the implied volatility, which is “*the volatility resulting from the market observed option prices*” (Taneja et al. 2019, p. 110005-1). The calculation of the implied volatility considers stock option prices quoted in the market and applies the Black-Scholes-Merton model to determine the value of the volatility parameter which makes the Black-Scholes-Merton valuation equal to market prices.

The Black-Scholes-Scholes model is widely used in the financial industry to price European stock options. However, there are some authors that criticize this model. In this

regard, following Yalincak (2005), the main critiques of the Black-Scholes-Merton model are set out as follows:

- i. The interest rates are not constant. The Black-Scholes-Merton model assumes that the interest rate term structure is constant, which is not consistent with the actual term structure of interest rates (Yalincak, 2005).
- ii. The returns of the underlying asset do not follow a normal distribution. The Black-Scholes-Merton model assumes that stock prices are lognormally distributed and, consequently, that stock returns are normally distributed. However, *“there is overwhelming evidence that the returns are not normal, but instead have a leptokurtic (i.e., long-tailed) distribution”* (Yalincak, 2005, p. 6).
- iii. The volatility of stocks is not constant. The Black-Scholes-Merton model assumes constant volatility. However, *“ever since the 1987 stock market crash, this assumption has proven false”* (Yalincak, 2005, p. 7).
- iv. There is not perfect liquidity, neither constant trading. The Black-Scholes-Merton model assumes that markets are perfectly liquid and that there is constant trading, so it is possible to sell or purchase any fraction of a security at any time (Yalincak, 2005). However, *“markets are not perfectly liquid”* as demonstrated by crisis events such as those of 1987, 1998 and 2007-2008 (Yalincak, 2005, p. 8).

- v. Traded stocks usually pay dividends to their shareholders. The Black-Scholes-Merton model assumes that stocks pay no dividends, which is not consistent with the actual dividend distributions of stocks. Having said this, the Black-Scholes-Merton model is usually “*adjusted by subtracting the discounted value of a future dividend from stock prices to account for dividends*” (Yalincak, 2005, p. 8), which allows the Black-Scholes-Merton model to overcome this critique.
  
- vi. There are transaction costs in the actual market. The Black-Scholes-Merton model assumes that “*there are no fees for buying and selling options and stocks and no barriers to trading*” (Yalincak, 2005, p. 8). However, this assumption is not consistent with the reality, since investors incur in transactions costs when trading securities.

Lattice models “*use discrete-time and discrete-state approximations to SDEs [Stochastic Differential Equations] to compute derivative prices*” (Broadie & Detemple, 2004).

Lattice models are usually represented by diagrams with the “*different possible paths that might be followed by the stock price over the life of an option*” (Hull, 2015, p. 274).

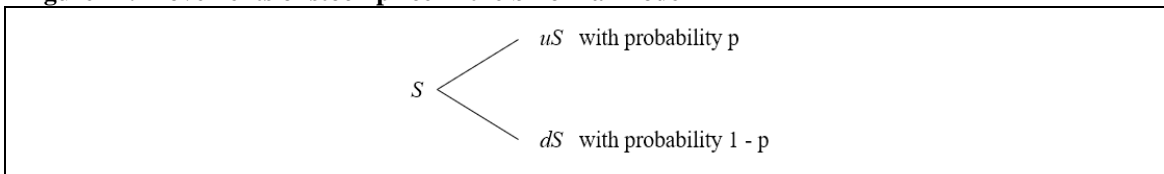
Lattice models comprise a wide variety of models, being the binomial model one of the main ones (Hull, 2015). The binomial model was developed by Cox, Ross and Rubinstein in 1979 (Cox et al., 1979). The binomial model assumes that:

- i. “*The stock price follows a multiplicative binomial process over discrete periods*” (Cox et al. 1979).

- ii. *“The rate of return on the stock over each period can have two possible values”*  
(Cox et al. 1979).
- iii. *“The interest rate is constant”* (Cox et al. 1979).
- iv. *“Individuals may borrow or lend as much as they wish”* (Cox et al. 1979).
- v. *“There are no taxes, transactions costs, or margin requirements”* (Cox et al. 1979).
- vi. *“Individuals are allowed to sell short any security and receive full use of the proceeds”* (Cox et al. 1979).

The development of the binomial model under the assumptions described above leads to the movements of the stock price that are represented in the following figure:

**Figure 17. Movements of stock price in the binomial model**



Source: Cox et al. (1979)

In particular, the stock price (defined as  $S$  at period start) can move up with probability  $p$  and down with probability  $1-p$ . If the stock price moves up, the new stock price is defined by  $uS$ . If the stock price moves down, the new stock price is defined by  $dS$ .

The up ( $u$ ) and down ( $d$ ) stock price changes can be calculated as follows (Hull, 2015):

$$u = e^{\sigma\sqrt{\Delta t}} \quad (7)$$

$$d = e^{-\sigma\sqrt{\Delta t}} \quad (8)$$

where  $t$  represents the time difference (in years) between the start and the end of the period over which the stock price movement is calculated.

Once the up and down movements are calculated, the probability of the stock price moving up ( $p$ ) and the probability of the stock price moving down are defined as (Hull, 2015):

$$\text{Up move probability } (p) = \frac{e^{(r-q)\Delta t} - d}{u - d} \quad (9)$$

$$\text{Down move probability} = 1 - p \quad (10)$$

where  $r$  is the interest rate and  $q$  is the dividend yield.

After calculating the probability of the stock moving up ( $p$ ) and down ( $1-p$ ), the binomial tree is built and the payoff of the option is calculated in each scenario. The binomial model will determine the option value as the present value of the average path payoff. In this regard, the payoff of a call option is calculated as the maximum between the stock price minus the strike and zero. And the payoff of a put option is calculated as the maximum between the strike price minus the stock price and zero.

The binomial model considers the same assumptions as the Black-Scholes-Merton model regarding the behavior of the stock price (Hull, 2015). Consequently, the same critiques to the Black-Scholes-Merton model also applies to the binomial model.

The Monte Carlo approach values derivatives “*using random numbers to sample many different paths that the variables underlying the derivative could follow in a risk-neutral world*” (Hull, 2015, p. 489).

Following Broadie & Detemple (2004), the steps to develop the Monte Carlo approach are set out as follows:

- i. “*Generate  $n$  random paths of the underlying state variables*” (Broadie & Detemple, 2004, p. 1167). This step consists in generating the paths that could be followed by the underlying variable (i.e., the stock price). The generation of these paths is performed generating random numbers from the distribution followed by the underlying variable.
- ii. Calculate the “*corresponding  $n$  discounted option payoffs*” (Broadie & Detemple, 2004, p. 1167). This step consists in calculating the option payoff in each one of the simulated paths and on calculating the present value of these payoffs.

- iii. Calculate the average discounted payoff in order “to estimate the expected value” (Broadie & Detemple, 2004, p. 1167). Once the present value of each payoff, the Monte Carlo approach determine the option value as the average of all present value payoffs.

The Monte Carlo approach assumes that stock prices are lognormally distributed. In this regard, the lognormal distribution of stock prices is defined by (Hull, 2015):

$$\ln S_t \sim f \left( \ln S_{t-1} + \left( \mu - \frac{\sigma^2}{2} \right) \partial\tau, \sigma^2\tau \right) \quad (11)$$

Applying Ito’s lemma on the previous equation, the stochastic process followed by stock prices is defined by the following formula (Hull, 2015):

$$\partial \ln S = \left( \hat{\mu} - \frac{\sigma^2}{2} \right) \partial\tau + \sigma \partial\phi \partial\tau \quad (12)$$

The accuracy of the Monte Carlo approach to value stock options increases as the number of simulations increases. For this reason, the Monte Carlo approach usually consider 10,000 or more simulations of stock price path.

The Monte Carlo approach is the most flexible approach to value stock options. Monte Carlo allows to value stock options with complex vesting conditions or stock options with several underlying variables.



### 3 Interest and Contributions of this Research

The interest of this research is set out as follows:

- i. **Interest for the general public.** Since the financial crisis that broke out in 2007-2008, there has been a growing interest of the general public in executive compensation. Indeed, there is a broad concern about executives receiving sumptuous compensations that are not related to the creation of value for shareholders. The present research particularly address this issue, determining to what extent CEO's compensation is linked to the creation of value for shareholders.
- ii. **Interest for regulators.** In line with the previous item, the interest of regulators in executive compensation plans has also increased considerably in recent years, issuing new regulation and putting more attention on these compensation plans. The present research provides greater knowledge about whether remuneration plans are associated with the creation of shareholder value, allowing regulators to have more information when making decisions about the regulation of executives' compensation plans.
- iii. **Interest for shareholders.** The present research is of special interest for shareholders, since it will provide an insight on the alignment between executive compensation and shareholder value creation. In this way, shareholders will have additional information to decide about executive compensation plans.

- iv. **Interest for corporate governance professionals.** By the same token, the current research is of special interest for corporate governance professionals. The results of this research will help these professionals to define executive compensation plans and also to evaluate the current alignment of executive compensation plans with shareholder value creation in comparison to the market average.

The present research will extend previous research on executive compensation through the:

- i. **Consideration of executives' personal investment in company's shares.** The lack of available data has been a constant in the research on executive compensation. That is precisely the reason why most of the literature has focused on the United States so far. However, Spanish regulation has significantly increased the availability of data, even requiring executives to disclose their personal investment in company's shares. In this way, it is possible to determine CEO's total incentives, which are composed by:
  - a. The incentives arising from the compensation package in the company.
  - b. The incentives arising from the CEO's personal investment in company's shares (which are non-restricted shares that the CEO could sell at any time).

The relevance of the incentive generated by the private investment in company's shares has been highlighted by the members of the National Securities Market Commission in the meeting held on the 11 October 2019.

Based on the feedback received on the present research, the consideration of executives' personal investment in company's shares is one of its main contributions.

- ii. **Extension to another cultural / international context.** The vast majority of the literature on executive compensation so far has been focused on data from the United States, using the ExecuComp and Compustat databases. The availability of data in the case of Spain (although its processing requires a huge field work) allows to extend the analysis in an international environment other than the United States. In this way, it is possible to culturally and geographically extend academic literature, which has so far been focused on data from the United States due to the absence of data available to carry the research in other countries.
- iii. **More accurate valuation of stock options and restricted shares using the available information in Spain.** In the case of Spain, there is a wide availability of data on the remuneration plans (i.e., all the characteristics of stock options are disclosed), which allows a much more accurate assessment of the remuneration that has been received by CEOs, thus avoiding the use of proxies of previous research (i.e., estimation of the exercise price of stock options based on the stock price on their announcement date).

- iv. **Valuation of share plans with Monte Carlo models (programmed in Matlab), an approach frequently used by practitioners in the financial industry, which allows incorporating characteristics such as the early execution of stock options or specific vesting conditions.** The programming of Monte Carlo models allows a wide variety of cases to be considered. Monte Carlo model programming is undoubtedly the most flexible methodology for the valuation of financial products, allowing to consider the specific characteristics of the product that is being valued, instead of using approximations or simplifications as it has often been the case in the literature so far (i.e., valuation of option plans with the Black-Scholes-Merton model assuming that the options will be executed at the beginning of the exercise period, which leads to a value below the actual option value).
  
- v. **Valuation of restricted shares with Monte Carlo models (programmed in Matlab),** again following the approach that is frequently used by practitioners in the financial industry. The valuation of restricted shares through programming specific Monte Carlo models for each plan results in a much more accurate valuation than the valuation obtained by treating them as unrestricted research (which is an approach that has been frequently used in the literature). In this regard, I would like to point out that the value of restricted shares whose final granting depends on a certain condition is lower than the value of an unrestricted share that executives can sell at any time.

**Figure 18. Interest and contributions of the present research**

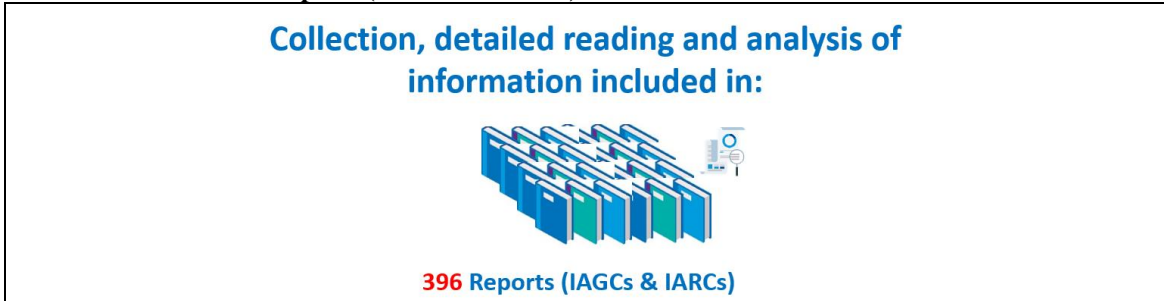
<b>Interest of the Research</b>	<ul style="list-style-type: none"> <li>■ Public interest in executive compensation from the break out of the financial crisis (2007-08).</li> <li>■ Regulators interest in executive compensation and its association with shareholder value creation.</li> <li>■ Shareholder interest in the alignment between executive compensation and shareholder value creation.</li> <li>■ Corporate governance professional interest in having comparable data to define and evaluate executive compensation plans.</li> </ul>
<b>Contributions of the Research</b>	<ul style="list-style-type: none"> <li>■ Consideration of executives' personal investment in company's shares (non-restricted shares).</li> <li>■ Extension of the literature to another cultural environment.</li> <li>■ Accurate valuations of stock options and restricted shares.</li> <li>■ Design &amp; development of a financial model to accurately value employee stock options.</li> </ul>

*Source: own preparation*

Finally, there is a contribution of the present research that consists in collecting, detailed reading, analyzing and tabulating the information of IAGCs & IARCs. Executive compensation information provided by Spanish companies are included in reports that are published annually (IAGCs & IARCs). These reports include a summary table of the compensation received by the CEO. However, these summary tables frequently include data that is not accurate (i.e., compensations that were paid during the year but that were accrued in a different year). Therefore, **it is necessary to go in detail throughout the text of each report to accurately determine the precise compensation received by the CEO and the detailed characteristics of each compensation plan.**

In this regard, I would like to point out that the development of the current research implied the **collection, detailed reading, analyses and tabulation of 396 reports** (IAGCs & IARCs). Besides, additional information had to be collected and processed to complete the analysis presented herein.

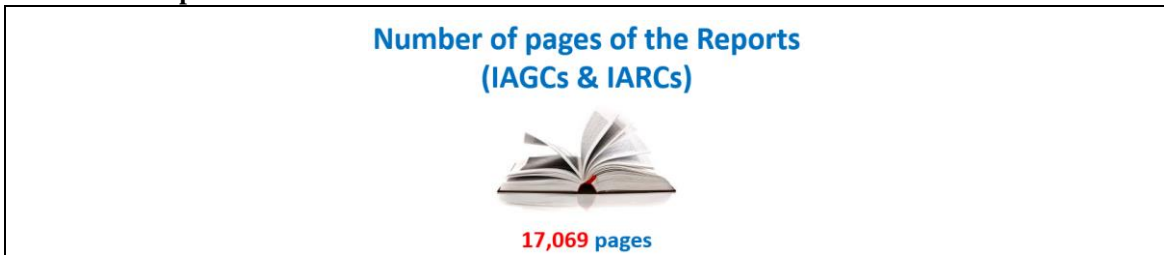
**Figure 19. Additional contribution of this research – Collection, detailed reading and analysis of the information of annual reports (IAGCs & IARCs).**



Source: own preparation

The analysis performed required **processing a total number of 17,069 pages** that made up the reports that were reviewed (IAGCs & IARCs).

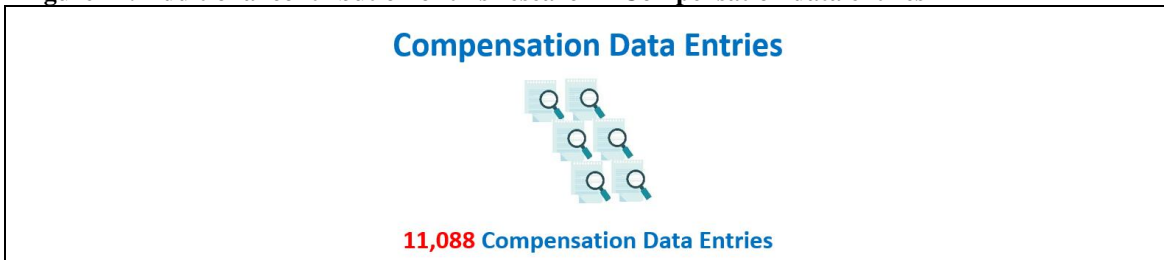
**Figure 20. Additional contribution of this research – Number of pages processed in relation to executive compensation data.**



Source: own preparation

The analysis developed in this research also required **the tabulation of 11,088 compensation data entries**, which are included in the summary tables and in the body of the annual reports (IAGCs & IARCs).

**Figure 21. Additional contribution of this research – Compensation data entries**



Source: own preparation

All in all, the analysis of the present research required the collection, detailed reading and analysis of **396 reports** (IAGCs & IARCS), processing **a total number of 17,069 pages** and tabulating **11,088 compensation data entries**.



## 4 Research Questions

This research is focused on the following areas:

- i. Analysis of CEO share holdings and compensation plan design in Spanish firms.
- ii. Relation between CEO incentives and firm performance.
- iii. Development of a financial model to value employee stock options.

In this regard, I highlight that:

- i. This research will analyze the relationship between variables, without cause-effect implications due to the lack of a valid identification instrument.
- ii. Since most of the literature on executive compensation is focused on US data, the available data for Spanish firms since 2013 constitutes a key opportunity to extend the research on executive compensation to other international environments.

In addition, the richness of Spanish information regarding executive compensation allows to carry out a deep analysis and to evaluate several research questions. In particular, the analysis outlined in this research is described in the following Sections.

## **4.1 CEO Shareholdings and Compensation Plan Design in Spanish Firms**

The description and analysis of executive compensation plans in Spain is largely missed by the literature on the subject. This research will fulfill this gap in the literature, covering three main questions:

*How are CEO compensated in Spanish firms? Description of executive compensation plans.*

The objective of this analysis consists in describing the remuneration components and their weight in Spanish firms.

This analysis will provide insights into the remuneration components used by Spanish firms and also their relevance in the total remuneration package received by CEOs.

*How often are short term bonus targets accomplished?*

In the meeting with the Spanish Securities & Exchange Commission (CNMV) on the 11 October 2019, the Regulators expressed their interest on evaluating the accomplishment of short term bonus. In particular, Regulators were concerned about the targets set out by companies to determine the bonus amount, since these targets could be too easy to achieve.

This research analyzes the accomplishment of short term bonuses by CEOs and provides insights regarding the likelihood to achieve those bonuses.

***What is the relationship between CEO compensation plans & CEO share holdings?***

In the case of Spanish firms, the regulation requires the disclosure of CEO share holdings when the CEO is a member of the Board of Directors. This information has not yet been used to evaluate the design of CEO incentives. In particular, it is interesting to know whether the design of CEO incentives take into account CEO share holdings. The current research covers this analysis.

The answer to these research question will provide contributions in the following area:

- i. **How are Spanish CEOs' compensation plans designed in Spanish firms?** The description of Spanish firms' CEO compensation plans will provide a detailed view about the components and structure of these compensation plans.
- ii. **Are CEO short term bonus target goals sufficiently challenging?** In the meeting with the Spanish Securities and Exchange Commission (CNMV) on the 11 October 2019, the regulators expressed their concerned about the design of CEO short term bonuses. In particular, they were worried about these bonuses being fairly easy to achieve. This research will provide insights into this matter.

- iii. **Are CEO share holdings considered when designing CEO compensation plans?** CEO share holdings constitute a personal interest in the company and, consequently, they represent an incentive for the CEO. This research analyses whether the incentive created by CEO share holdings is taken into account in the design of CEO compensation plans.

## **4.2 CEO Incentives & Firm Performance**

An important area of analysis corresponds to the relationship between CEO incentives and firm performance. In this way, several papers have analyzed whether CEO are paid like bureaucrats (where CEO compensation is not linked to firm performance) or whether CEO are paid for the value they create for shareholders.

The vast majority of the literature on this subject is focused on US data. This Dissertation extends the research in other countries by analyzing the relation between CEO incentives and firm performance in Spanish firms. In addition, this Dissertation considers the incentive created by CEO share holdings, which is an important source of incentives.

In particular, the question that will be analyzed in this area is *what is the relationship between CEO incentives & shareholder value creation?*

The answer to this question will provide insights into the relationship between CEO incentives and shareholder value creation. As exposed by Jensen & Meckling (1976),

CEO compensation constitutes a mechanism to align CEO interests with shareholder interests, reducing the agency problem caused by the separation of control and ownership.

Therefore, this area of analysis will directly study the alignment of CEO incentives and shareholder value creation.

The evaluation of this research question will be performed using the following pay-performance sensitivity measures:

- i. Euro amount increase in CEO compensation for each one thousand euro increase in shareholder value.
- ii. Euro amount increase in CEO compensation for each percentage point increase in shareholder value.
- iii. Percentage increase in CEO compensation for each percentage point increase in shareholder value.

This area of analysis of the Dissertation contributes to evaluate whether CEOs are paid like bureaucrats. In this regard, CEO compensation should be linked to firm performance to align the interests of CEO and shareholders.

### 4.3 Employee Stock Option Valuation Model (ESOVVM)

The literature so far has applied the Black-Scholes-Merton model to determine the value of employee stock options. However, this model does not provide accurate valuations of employee stock options because it is not adequate to value options that can be exercised over a period of time (Bermudan options) and it does not take into account that employee stock options tend to be exercised early, sacrificing part of the stock option time value.

In this context, this research develops and programs a financial model to **determine what is the value of employee stock options?** To accurately value employee stock options, the financial model will take into account their exercise characteristics. This financial model will be coded in the Matlab computer language.

This area of analysis will contribute to literature by providing a financial model that accurately determines the value of employee stock options. In this regard, despite the literature on executive compensation has concluded that employee stock options are executed before maturity, hence sacrificing part of the option time value, the literature has not developed a model that incorporates this early exercise characteristic. This research will fill this gap in the literature by developing and programming a Monte Carlo valuation model in Matlab to value employee stock options.

## 4.4 Summary

The analysis of this research provides contributions to evaluate the following questions:

- i. **How are CEOs' compensation plans designed in Spanish firms?** The description of Spanish firms' CEO compensation plans will provide a detailed view about the components and structure of these compensation plans.
- ii. **Are CEO short term bonus target goals sufficiently challenging?** During the development of this research, I had the opportunity to meet with the representatives of the Spanish Securities & Exchange Commission (CNMV) on the 10 January 2019 and on the 11 October 2019, where the representatives of the CNMV expressed their concern about the design of CEO short term bonuses. In particular, they were worried about these bonuses being fairly easy to achieve. This research will provide insights into this matter.
- iii. **Are CEO share holdings considered when designing CEO compensation plans?** CEO share holdings constitute a personal interest in the company and, consequently, they represent an incentive for the CEO. This research analyses whether the incentive created by CEO share holdings is taken into account in the design of CEO compensation plans.
- iv. **Are CEOs paid like bureaucrats?** As exposed by Jensen & Meckling (1976), CEO compensation constitutes a mechanism to align CEO interests with

shareholder interests, reducing the agency problem caused by the separation of control and ownership. In this regard, CEO compensation should be linked to firm performance to align the interests of CEO and shareholders. This research analyses the relation between CEO incentives and firm performance.

- v. **What is the value of employee stock options?** The literature on executive compensation has concluded that employee stock options are executed before maturity, hence sacrificing part of the option time value. However, the literature has not developed a model that could provide an accurate valuation of employee stock options. This research will fill this gap in the literature by developing and programming a Monte Carlo valuation model in Matlab to value employee stock options.

**Figure 22. Summary of the contribution areas of this research**

<b>1. Description and Analysis of CEO Compensation Plan Design in Spanish firms</b>	<ul style="list-style-type: none"> <li>❖ How are Spanish CEOs' compensation plans designed in Spanish firms?</li> <li>❖ Are CEO short term bonus target goals sufficiently challenging?</li> <li>❖ Are CEO share holdings considered when designing CEO compensation plans?</li> </ul>
<b>2. CEO Compensation &amp; Firm Performance</b>	<ul style="list-style-type: none"> <li>❖ Are CEOs paid like bureaucrats?</li> </ul>
<b>3. Employee Stock Option Valuation</b>	<ul style="list-style-type: none"> <li>❖ What is the value of employee stock options?</li> </ul>

*Source: own preparation*

## **5 Data**

### **5.1 Executive Data**

The analysis of this research is based on the executive compensation data included in Annual Corporate Governance Reports (IAGCs) and Annual Director's Remuneration Reports (IARCs).

The IAGCs and IARCs include information of compensation and private investment in firm's shares of each member of the Board of Directors. Therefore, there is information available for each of the Directors of each company. If an executive is not a member of the Board of Directors, then the IAGCs and IARCs will provide no information for this executive's compensation.

The literature so far has focused on the compensation of the CEO (Jensen & Murphy, 1990; Hall & Liebman, 1998; Palia, 2001). I have followed the same approach in the present research, using data regarding CEO compensation. As far as the CEO is a Director of the company, the IAGCs and IARCs disclose compensation information. With very few exceptions, CEOs in the sample data are members of the Board of Directors.

The initial step in the collection and tabulation of data consisted in the rigorous identification of the CEO for each one of the companies for each one of the years in the dataset. In this identification, I carried out a research on public sources of information

such as IARCs, IAGCs, companies' annual reports and official communications to the CNMV (*“hechos relevantes”*).

After identifying the CEO, I carefully read and tabulated the information included in the IARCs regarding the compensation of the CEO. In this regard, I highlight the effort required to understand the characteristics of several compensation plans due to the complex and difficult language employed, which is probably associated with the hesitance of companies to disclose executive compensation data.

I would also like to highlight several adjustments I made in relation to the information included in the IARCs' summary tables. As explained in detail later in this Section, the information of these tables was fairly often inaccurate (i.e., the tables missed the consideration of some compensation plans, or the tables only included the paid bonus compensation instead of the accrued bonus compensation).

The IARCs contain information regarding the following items of executive compensation:

- i. Compensation from the parent company, broken down into:
  - a. Salary.
  - b. Fixed remuneration.
  - c. Attendance fees.

- d. Short term bonus.
  - e. Long term bonus.
  - f. Membership of Committees.
  - g. Severance payments.
  - h. Other concepts.
  - i. Share based compensation.
  - j. Contribution to saving schemes.
  - k. Other benefits.
- ii. Compensation from subsidiaries, broken down into:
- a. Salary.
  - b. Fixed remuneration.
  - c. Attendance fees.
  - d. Short term bonus.
  - e. Long term bonus.
  - f. Membership of Committees.

- g. Severance payments.
- h. Other concepts.
- i. Share based compensation.
- j. Contribution to saving schemes.
- k. Other benefits.

In addition, the IAGCs include information regarding the executive private portfolio of company's shares at the end of the period. The private portfolio corresponds to private shareholdings that the executive could sell at any time without any restriction and, consequently, they are not part of the CEO compensation package.

Finally, using information of share price and dividends obtained from Bloomberg, I determined CEO's incentives derived from his/her private portfolio of company's shares.

I would like to point out that the executive compensation data considered in the analysis has an objective character despite it differs from the summary tables included in the IARCs. The differences are due to information included in the body of IARCs that enriches and/or corrects the information included in the summary tables. Appendix V presents several examples of information included in the body of IARCs and how it was codified for the analysis.

## 5.2 Market Data

Market data has been incorporated into the analysis to perform the required calculations.

In this regard, I have considered the annual accounts that were published by the companies during the Observation Period. Using these annual accounts, I obtained data of revenues, profits, total assets, capital increases/decreases and dividends.

I used Informa database to obtain the constitution date of each company under analysis and, consequently, to determine firm age.

I used Bloomberg to obtain data from financial markets such as stock prices, dividends per share, stock splits/counter-splits, betas, volatilities and correlations between stocks.

Regarding stock prices, I only considered no-adjusted prices to accurately calculate the amount of shareholder value created each year. In this respect, some pay-performance measures are expressed as compensation per €1,000 of shareholder value increase (expressed in nominal terms, that is to say, without adjusting stock prices for dividends).

Adjusted stock prices implicitly consider dividends and they are useful to determine increases in shareholder value in percentage terms. However, adjusted stock prices are not useful to accurately determine increases in shareholder value in euro terms because of how adjusted stock prices are calculated (they eliminate the price impact of dividends pay-outs at the cost of not reflecting actual market prices).

Regarding script dividends, companies may give them either optional or compulsory. If they are optional, the company also provides a euro dividend amount and this amount is taken into consideration in the calculations performed. Consequently, optional script dividends have no impact on the calculations because they are considered through their euro equivalent amount.

When the script dividends were compulsory, I used their euro equivalent amount obtained from Yahoo financial database. In this regard, only one sampled company had compulsory script dividends during the Observation Period.

Additional market information has been obtained from internet (i.e., from electronic newspapers or companys' webpages). I used this information to identify the CEO of each company, the CEOs start date in their role or to describe the business activity developed by each of the sampled companies.

## 6 Methodology

In the following Sections I present the methodology used in the analysis of each of the areas of analysis of this Dissertation.

### 6.1 Methodology for the Analysis of CEO Compensation Plan Design and Share Holdings

The analysis of CEO compensation plan design and share holdings is based on the information included in:

- i. IARCs (Annual Director's Remuneration Report).
- ii. IAGCs (Annual Corporate Governance Report).

I used the IARCs and IAGCs to identify the CEO of each company for each year of the Observation Period. In addition, I used other sources such as companies' websites or newspapers. When the CEO (*Consejero Delegado*) was clearly identified in the organization chart, I used this information. In cases where the CEO was not clearly identified, I selected the person with the highest responsibility within the organization chart.

Based on the information included in IARCs and IAGCs, and following Gomez (2019), I considered the following components of executive compensation:

- i. Salary.
- ii. Fixed remuneration.
- iii. Membership of Committees.
- iv. Attendance fees.
- v. Saving schemes.
- vi. Other items.
- vii. Short-term bonus.
- viii. Long-term bonus.
- ix. Restricted shares granted.
- x. Options granted.
- xi. Estimated remuneration.
- xii. Annual change in the portfolio of restricted shares.
- xiii. Annual change in portfolio of options.
- xiv. Annual change in portfolio of private shares.

After gathering and coding the information of executive compensation, I determined the amount of executive incentives (both compensation incentives and private incentives through share holdings in the company), which are:

- i. Short term bonus.
- ii. Long term bonus.
- iii. Annual change in the portfolio of stock options.
- iv. Annual change in the portfolio of restricted shares.
- v. Annual change in the portfolio of private shares.

The determination of executive compensation is based both on the information included in the summary tables at the end of the IARCs as well as on the information included in the body of these reports.

Regarding short-term bonus, I considered the amount accrued in each year of the Observation Period. Following Gomez (2019), I applied an accrual principle (focusing on estimated remuneration) instead of a cash principle (focusing on effective remuneration).

I would like to highlight that the determination of the annual change in the portfolio of stock options is based on the Employee Stock Option Valuation Model (ESOVM) that is included in Appendix II and that forms part of the areas of analysis of the present Dissertation (please refer to Sections 6.4 and 10 for more details).

Section 7 incorporates the detailed description of CEO compensation plans and their aggregated evolution during the Observation Period.

## **6.2 Methodology for the Analysis of the Relation between CEO Incentives and Firm Performance**

In the analysis of the relation between CEO incentives and firm performance, I applied the same methodology that has been used in the literature. In this regard, the literature (Jensen & Murphy, 1990; Hall & Liebman, 1998; Gomez, 2019) has used the following pay-performance sensitivity measures:

- i. *“The expected variation in the value of the director’s portfolio for every 1,000 euros of variation in the value of the company’s shares”* (Gomez, 2019, p. 144). This measure indicates how much euro incentive the CEO receives per 1,000 euros of value created for shareholders.
- ii. *“How much the value in euros of the director’s portfolio of shares and options changes at the end of each year when the return hypothetically doubles, moving from the median return of the sample to the 75th percentile”* (Gomez, 2019, p. 145). This measure indicates how much euro incentive the CEO receives when the company’s return increases from the median to the 75th percentile.
- iii. *“The expected percentage change in the director’s estimated wealth at the end of the year in response to changes in the company’s return”* corresponding to an

increase from the median return to the 75th percentile return (Gomez, 2019, p. 145). This measure indicates how much incentive the CEO receives, expressed as percentage of CEO's estimated compensation, when the company's return increases from the median to the 75th percentile.

Regarding the calculation of CEO estimated compensation, I consider the compensation that was accrued in each year of the Observation Period. In this regard, I applied the Employee Stock Option Valuation Model (ESOVM) to determine the accrued compensation corresponding to the increase in the CEO's portfolio of stock options. The Matlab code of the Employee Stock Option Valuation Model (ESOVM) is included in Appendix II.

In addition, I designed, programmed and verified a financial model to value Telefonica's Plan 2014 and Plan 2015 of restricted shares. The consolidation of these shares was subject to the evolution of the fourteen companies that were part of the DJ Global Sector Titans Telecommunications Index. The Matlab code of this financial model is included in Appendix III.

I classified CEO's compensation and the increase in wealth from CEO's private portfolio of company shares as follows:

- i. **Fixed Salary**: which corresponds to executive's fixed salary during the period.

- ii. **Other:** which corresponds to compensation components that are not linked to firm performance, in particular:
  - a. Fixed remuneration.
  - b. Attendance fees.
  - c. Membership of Committees.
  - d. Severance payments.
  - e. Other concepts.
  - f. Contribution to saving schemes.
  - g. Other benefits.
- iii. **Grant value:** which corresponds to the grant value of share based compensation plans.
- iv. **Short term bonus:** which corresponds to the annual short term bonus.
- v. **Long term bonus:** which corresponds to the multiannual long term bonus
- vi. **Options:** which corresponds to the compensation from the value change in the portfolio of options.

- vii. **Restricted shares:** which corresponds to the compensation from the value change in the portfolio of restricted shares, including dividends when applicable.
- viii. **Private portfolio:** which corresponds to the value change of executive's private portfolio of company's shares, including dividends.

In particular, the private portfolio is formed by the CEO's personal investment in company's shares. Therefore, the private portfolio represents a private investment of the CEO in company's shares and, consequently, the CEO could dispose of this investment at any time. Consequently, the incentive arising from the private portfolio is not part of the CEO compensation package.

I would like to add that if the CEO had any limitation to dispose of the shares (i.e., the CEO being obliged to hold the shares during a specific period of time), the investment would have been treated as restricted shares.

In the determination of CEO compensation, I applied the following assumptions and considerations:

- i. **Variable compensation.** I consider as variable compensation the variable components of executive compensation whose value was not set at the beginning of the period, in particular:
  - a. Short term bonus.
  - b. Long term bonus.

- c. Options (excluding the grant value).
  - d. Restricted shares (excluding their grant value).
  - e. Private portfolio.
- ii. **Option exercise date.** Companies usually specify the starting month of options' exercise period, but not the exact date. When this happened, I assumed that the exercise period started on day 15 of the specified month.
- iii. **Option maturity date.** Companies usually specify the maturity month of the options, but not the exact date. When this happened, I assumed that the maturity date was on day 15 of the specified month.
- iv. **Long-term bonus annual accretion.** The analysis of the present research is based on annual data. Therefore, it is necessary to determine the annual accretion of long-term bonuses. In this regard, if the amount of long-term bonus was fully considered in the year the long-term bonus is granted, a measurement error would be introduced into the analysis. This measurement error would be due to the fact that long-term bonuses do not compensate the performance of a particular year, but instead they compensate the performance during the years the long-term is in effect.

Therefore, the analysis of this research considers that long-term accrue as follows. First, I calculated the amount of long-term bonus per euro of value creation for shareholders during the long-term bonus period. And second, I multiplied the previous measure by the value created for shareholders in each one of the years of the long-term bonus period.

- v. **Long-term bonus compensations that depend on future performance at the end of the Observation Period.** In the case of bonus plans with compensation subject to future performance after 2017, I did not consider any compensation associated to these plans because there was no compensation accrued at the end of the Observation Period.
- vi. **CEO identification when there was two executives.** When the CEO position was occupied by two executives, one of these executives was also the President of the company. In these cases, I considered the Executive President as the CEO of the company.
- vii. **Incomplete CEO years.** The analysis of the present research is based on annual data. Therefore, the consideration of partial annual data would bias this analysis. For this reason, I only considered observations (years) in which the CEO managed the company during at least eleven months.

To calculate the value created for shareholders during each period, I considered the impact of dividends, capital increases and capital decreases. The process to determine how much shareholder value was created in each year of the Observation Period is set out as follows:

- i. I obtained the number of shares outstanding at the beginning and at the end of each year from the IAGCs.
- ii. I obtained the number of treasury stock at the beginning and at the end of each year from the IAGCs.

- iii. I obtained the share price at the beginning and at the end of each year from Bloomberg.
- iv. I obtained the dividends paid, the capital increases and the capital decreases from the individual annual accounts of each company for each year of the Observation Period.
- v. I calculated the shareholder value created in each year of the Observation Period as:
  - a. the number of shares at the end of the period (net of treasury stock) multiplied by the stock price at the end of the period,
  - b. minus the number of shares at the beginning of the period (net of treasury stock) multiplied by the stock price at the beginning of the period,
  - c. plus the dividends paid during the year,
  - d. minus capital increases during the year,
  - e. plus capital decreases during the year.

**Figure 23. Calculation of annual shareholder value creation**

$$\begin{aligned}
 &+ \left( \begin{array}{c} \text{No shares} \\ \text{beginning} \end{array} - \begin{array}{c} \text{Treasury stock} \\ \text{beginning} \end{array} \right) \times \begin{array}{c} \text{Share price} \\ \text{beginning} \end{array} \\
 &- \left( \begin{array}{c} \text{No shares} \\ \text{end} \end{array} - \begin{array}{c} \text{Treasury stock} \\ \text{end} \end{array} \right) \times \begin{array}{c} \text{Share price} \\ \text{end} \end{array} \\
 &+ \text{dividends paid during the year} \\
 &- \text{capital increases during the year} \\
 &+ \text{capital decreases during the year} \\
 \hline
 &= \text{shareholder value created during the year}
 \end{aligned}$$

Source: own preparation

### 6.3 Methodology for the Development of the Employee Stock Option Valuation Model (ESOVM)

To accurately determine the value of employee stock options, I designed, programmed and verified a financial model to value employee stock options (hereinafter, the Employee Stock Option Valuation Model).

This financial model takes into consideration common characteristics of employee stock options, such as their exercise period (they are usually exercisable after a holding period, that is, they are Bermudan options) and that they are usually exercised before their maturity date (sacrificing time value).

In the literature so far, employee stock options have been valued using approximations and simplifications, such as applying the Black-Scholes-Merton formula assuming that the options will be exercised on the first date of the exercise period. However, this approach does not provide accurate results, since it does not assign any value to the

possibility of exercising the option between the first date of the exercise period and the final vesting date.

The Employee Stock Option Valuation Model developed in this research uses the Monte Carlo methodology to value employee stock options. The Monte Carlo methodology constitutes a widely recognized approach to valuing derivatives and making investment decisions (Monjas & Balibrea, 2014).

The Monte Carlo methodology is based on generating random simulations of the stock price path and calculating the option payoff on each of these simulations, obtaining the value of the option as the present value of the average payoff in the simulations.

In particular, the Monte Carlo methodology considers that stock prices are lognormally distributed, which is a common assumption in the valuation of stock options (the Black-Scholes-Merton approach also uses this assumption). The lognormal distribution of stock prices is defined by the following formula (Hull, 2015):

$$\ln S_t \sim f \left( \ln S_{t-1} + \left( \mu - \frac{\sigma^2}{2} \right) \partial\tau, \sigma^2\tau \right) \quad (13)$$

Applying Ito's lemma on the previous equation, the stochastic process followed by stock prices is defined by the following formula (Hull, 2015):

$$\partial \ln S = \left( \hat{\mu} - \frac{\sigma^2}{2} \right) \partial\tau + \sigma \partial\varnothing \partial\tau \quad (14)$$

The Monte Carlo methodology represents a much more flexible approach than the Black-Scholes-Merton formula. Using the Monte Carlo methodology, I incorporated the early exercise character of executive stock options into the design of the Employee Stock Option Valuation Model. In this regard, I considered the analysis developed by Bettis et al. (2005), which concludes that executives sacrifice up to 10% of option value because of early exercise. The conclusion of Bettis et al. (2005) is also supported by the studies of Heron & Lie (2017), who found that executives sacrifice 12.2% of option value because of early exercise, and Boyd et al. (2010), who found that executives sacrifice 8.8% of option value because of early exercise. Huddart et al. (1994) also concludes that early option exercise takes place when the option is deep in the money, which is consistent with the 10% estimation of sacrificed option value (which implies that 90% of option value is intrinsic value and, hence, the option is deep in the money).

In this way, the Employee Stock Option Valuation Model developed in this research considers that CEOs will execute the option during the exercise period when the sacrificed value is equal or lower than the previous 10% reference rate. Consequently, the implementation of the Monte Carlo methodology requires the calculation of the market value of the option for each day of the exercise period and for each one of the simulations, which I performed using the Black-Scholes-Merton approach (it is necessary to know this value to determine whether the option would be executed in the time period of the simulation at consideration).

The Black-Scholes-Merton approach calculates the value of a call option based on the following formula:

$$C = S e^{-q\tau} N(d_1) - e^{-r\tau} K N(d_2) \quad (15)$$

where:

$$d_1 = \frac{\ln(S/K) + \left(r - q + \frac{\sigma^2}{2}\right)\tau}{\sigma \sqrt{\tau}}$$

$$d_2 = d_1 - \sigma \sqrt{\tau}$$

Due to the high number of simulations (10,000 simulations), the high number of exercise dates and the calculations to be performed for each exercise date of each simulation, the first model I developed was very slow to complete the valuation. For this reason, I improved this model to make it computationally more efficient.

Once I developed the financial model using the Monte Carlo approach, I verified that it worked correctly comparing the results of the financial model for several plain vanilla European options with the results obtained applying the Black-Scholes-Merton formula.

Appendix I contains the Matlab code corresponding to the initial version of the Employee Stock Option Valuation Model (ESOVM<sub>i</sub>), and Appendix II contains the Matlab code for the optimized and more efficient version of the Employee Stock Option Valuation Model (ESOVM<sub>o</sub>).

## 7 Results & Discussion regarding CEO Compensation Plan Design in Spanish Firms

### 7.1 Description of CEO Compensation Plans between 2013 and 2017

The following Sections present a detailed description of executive compensation plans in the sampled companies.

#### 7.1.1 Abengoa, S.A.

Abengoa, S.A. (hereinafter, **Abengoa**) is a Spanish company founded on the 4 January 1941<sup>9</sup>. Abengoa is an “*international company that applies innovative technology solutions for sustainability in the infrastructures, energy and water sectors*”<sup>10</sup>.

On the 25 October 2010, the Board of Directors of Abengoa appointed Manuel Sanchez Ortega as CEO of the company. Manuel Sanchez Ortega was CEO of Abengoa between 25 October 2010 and 18 May 2015.

On the 18 May 2015, the Board of Directors of Abengoa appointed Santiago Seage Medela as CEO of the company. Santiago Seage Medela was CEO of Abengoa between 18 May 2015 and 28 November 2015.

---

<sup>9</sup> Informa Database (2020).

<sup>10</sup> Abengoa’s webpage ([http://www.abengoa.com/web/en/compania/nuestra\\_historia/#det7\\_2](http://www.abengoa.com/web/en/compania/nuestra_historia/#det7_2)).

On the 28 November 2015, the Board of Directors of Abengoa appointed Joaquín Fernández De Pierola Marín as CEO of the company. Joaquín Fernández De Pierola Marín was CEO of Abengoa from 28 November 2015 until the End of the Observation Period. Joaquín Fernández De Pierola Marín ceased as member of the Board of Directors in November 2016 (despite the continued to be the CEO of the company afterwards). Consequently, there information of his compensation in the 2017 is not available.

The compensation of Manuel Sanchez Ortega between 2013 and 2014 was formed by:

- **Fixed salary.** Manuel Sanchez Ortega had a fixed salary of €1,086k in 2013 and 2014.
- **Short-term bonus.** Manuel Sanchez Ortega had a short-term bonus in 2013 and 2014.
- **Long-term bonus.** Manuel Sanchez Ortega had the following long-term bonus in 2013 and 2014:
  - **Plan January 2011.** This plan comprised the years 2011 – 2015. This plan did not provide any compensation to Manuel Sanchez Ortega.
  - **Plan January 2014.** This plan comprised the years 2014 – 2017. This plan did not provide any compensation to Manuel Sanchez Ortega.

- **Plan July 2014.** This plan comprised the years 2014 – 2018. This plan did not provide any compensation to Manuel Sanchez Ortega.
- **Share based compensation.** Manuel Sanchez Ortega did not have any share based compensation in 2013 and 2014.
- **Other concepts.** Manuel Sanchez Ortega received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Joaquín Fernández De Pierola Marín in 2016 was formed by:

- **Fixed salary.** Joaquín Fernández De Pierola Marín had a fixed salary of €571k in 2016.
- **Short-term bonus.** Joaquín Fernández De Pierola Marín had a short-term bonus in 2016.
- **Long-term bonus.** Joaquín Fernández De Pierola Marín had the following long-term bonus in 2016:
  - **Plan January 2014.** This plan comprised the years 2014 – 2017. The IARCs of Abengoa do not provide information regarding the compensation received by Joaquín Fernández De Pierola Marín under this plan.

- **Plan July 2014.** This plan comprised the years 2014 – 2018. The IARCs of Abengoa do not provide information regarding the compensation received by Joaquín Fernández De Pierola Marín under this plan.
- **Share based compensation.** Joaquín Fernández De Pierola Marín did not have any share based compensation in 2016.
- **Other concepts.** Joaquín Fernández De Pierola Marín did not receive additional compensation for other concepts.

### 7.1.2 Abertis Infraestructuras, S.A.

Abertis Infraestructuras, S.A. (hereinafter, **Abertis**) is a Spanish company founded on the 24 February 1967<sup>11</sup>. Abertis is dedicated to managing toll roads, being “*one of the international market leaders in the management of toll roads, managing over 8,600 kilometers of high capacity and quality roads in 15 countries in Europe, the Americas and Asia*”<sup>12</sup>.

On the 5 June 2010, the Board of Directors of Abertis appointed Francisco Reynés Massanet as CEO of the company. Francisco Reynés Massanet was CEO of Abertis between 1 January 2013 and 31 December 2017.

---

<sup>11</sup> Informa Database (2020).

<sup>12</sup> Abertis’ webpage (<https://www.abertis.com/en/the-group/about-abertis>).

The compensation of Francisco Reynés Massanet, CEO of Abertis, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,500k between 2013 and 2016, that increased to €1,650k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

- In 2013, 2014, 2015, 2016 and 2017, the IARC tables reported by Abertis reduced the short-term bonus amount in the compensation received by the CEO for participating in the boards of Abertis and its subsidiaries. I corrected this bias, which amounts to 187k-386k, to determine the actual bonus earned by the CEO.
- In 2014, 2015 and 2016, the IARC tables reported by Abertis reflected part of the short-term bonus as contribution to the pension plan (this was due to the bonus being paid as contribution to the pension plan). I adjusted the data (in amounts between 231k and 777k) to determine the actual bonus earned by the CEO.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014.

Observation Period:

- **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014.

Regarding the long-term bonus:

- In 2014, the tables reported by Abertis reflected part of the long-term bonus of Plan 2014 as contribution to the pension plan (this was due to the bonus being paid as contribution to the pension plan). I adjusted the data (in 3,046k) to determine the actual bonus earned by the CEO.
- **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017.  
Regarding the long-term bonus:
  - In 2017, the tables reported by Abertis reflected the long-term bonus of Plan 2015-2017 as contribution to the pension plan (this was due to the bonus being paid as contribution to the pension plan). I adjusted the data (in 8,250k) to determine the actual bonus earned by the CEO.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2010.** This is a stock option plan with the following characteristics:
    - Number of options: 115,762 options.
    - Strike price: €14.08.
    - Options grant date: 27 April 2010.

- Exercise date: from 28 April 2013 till 28 April 2015.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2013, generating a €285k payoff.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.3 Acciona, S.A.

Acciona, S.A. (hereinafter, **Acciona**) is a Spanish company founded on the 16 June 1916<sup>13</sup>. Acciona *“is a leading supplier of sustainable infrastructure solutions and renewable energy projects worldwide”*<sup>14</sup>. Acciona *“covers the entire value chain”*<sup>15</sup>, including the *“design, construction, operation and maintenance”*<sup>16</sup>.

The highest ranked executive of Acciona is Jose Manuel Entrecanales Domecq, who was appointed as CEO of the company on the 29 January 2004. Jose Manuel Entrecanales Domecq was the CEO and President of Acciona between 1 January 2013 and 31 December 2017.

---

<sup>13</sup> Informa Database (2020).

<sup>14</sup> Acciona 2017 Annual Report (page 12).

<sup>15</sup> Acciona 2017 Annual Report (page 12).

<sup>16</sup> Acciona 2017 Annual Report (page 12).

The compensation of Jose Manuel Entrecanales Domecq, CEO and President of Acciona, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,000k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO did not have any long-term bonus in 2013. From 2014, the CEO had the following long-term bonus:
  - **Plan 2014-2020.** This is a long-term bonus that is payable in shares of the company. This long-term bonus is evaluated in two separate periods (i) 2014 – 2016 and (ii) 2017 – 2020. The bonus paid in shares of the first period (2014 – 2016) will consolidate after the end of the long-term bonus plan in 2020. Hence, this compensation plan has two components during the Observation Period:
    - The incentive corresponding to the bonus associated to the performance between 2014 and 2016, which was included in the calculations as long-term bonus.
    - The incentive corresponding to the share price performance during 2017, which is equivalent to restricted shares. For this reason, the remuneration associated with this incentive was included in the

calculations as variable remuneration associated with restricted shares.

– **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:

○ **Plan 2009.** This is a stock option plan with the following characteristics:

- Number of options: 2,529 options.
- Strike price: €89.00.
- Options grant date: 24 June 2009.
- Exercise date: from 15 April 2012 till 15 March 2015.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

○ **Plan 2010.** This is a stock option plan with the following characteristics:

- Number of options: 4,342 options.
- Strike price: €91.10.
- Options grant date: 23 June 2010.

- Exercise date: from 15 April 2013 till 15 March 2016.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

- **Plan 2011.** This is a stock option plan with the following characteristics:

- Number of options: 4,874 options.
- Strike price: €53.00.
- Options grant date: 31 December 2012.
- Exercise date: from 15 April 2014 till 15 March 2017.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2017, generating a €107k payoff.

- **Plan 2012.** This is a stock option plan with the following characteristics:

- Number of options: 9,995 options.
- Strike price: €63.73.
- Options grant date: 31 December 2012.

- Exercise date: from 15 April 2015 till 15 March 2018.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2017, generating a €84k payoff.

- **Plan 2013.** This is a stock option plan with the following characteristics:

- Number of options: 10,138 options.
- Strike price: €56.21.
- Options grant date: 6 June 2013.
- Exercise date: from 15 April 2016 till 15 March 2019.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2017, generating a €189k payoff.

- **Plan 2014.** This is a stock option plan with the following characteristics:

- Number of options: 5,511 options.
- Strike price: €62.84.
- Options grant date: 24 June 2014.

- Exercise date: from 15 April 2017 till 15 March 2020.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2017, generating a €68k payoff.

- **Restricted Shares 2013.** This is a restricted shares plan with the following characteristics:

- Number of restricted shares: 1,334 restricted shares.
- Restricted shares grant date: 6 June 2013.
- Restricted shares grant price: €47.40.
- Restricted shares vesting date: 6 June 2016.
- Vesting conditions: continuing working for the company.

- **Restricted Shares 2014.** This is a restricted shares plan with the following characteristics:

- Number of restricted shares: 835 restricted shares.
- Restricted shares grant date: 24 June 2014.
- Restricted shares grant price: €66.76.

- Restricted shares vesting date: 24 June 2017.
  - Vesting conditions: continuing working for the company.
- **Other concepts.** The CEO perceived additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.4 Acerinox, S.A.

Acerinox, S.A. (hereinafter, **Acerinox**) is a Spanish company founded on the 30 September 1970<sup>17</sup>. Acerinox is dedicated to “*manufacturing of stainless steels and nickel alloys*”<sup>18</sup>.

On July 2010, the Board of Directors of Acerinox appointed Bernardo Velázquez Herreros as CEO of the company. Bernardo Velázquez Herreros was CEO of Acerinox between 1 January 2013 and 31 December 2017.

The compensation of Bernardo Velázquez Herreros, CEO of Acerinox, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €387k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

---

<sup>17</sup> Informa Database (2020).

<sup>18</sup> Acerinox’s webpage (<https://www.acerinox.com/en/grupo-acerinox/quienes-somos/>).

- **Long-term bonus.** The CEO did not have any long-term bonus between 2013 and 2017.
- **Share based compensation.** The CEO did not have any share based compensation between 2013 and 2017
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

Regarding the contributions to pension plans:

- The tables reported by Acerinox in 2013 do not include the contribution to CEO’s pension plan, while this information is included in the tables reported for 2014. In the calculations performed, I amended the missed data in 2013 Acerinox’s reported tables.

#### **7.1.5 ACS, Actividades de Construcción y Servicios, S.A.**

ACS, Actividades de Construcción y Servicios, S.A. (hereinafter, **ACS**) is a Spanish company founded on 13 October 1942<sup>19</sup>. ACS is a “*worldwide reference in the construction and services activities*”<sup>20</sup>. Florentino Pérez Rodríguez was appointed as President and CEO of ACS in 1993, occupying these positions during the Observation Period.

---

<sup>19</sup> Informa Database (2020).

<sup>20</sup> ACS’ webpage (<https://www.grupoacs.com/about-ac/>).

The compensation of Florentino Pérez Rodríguez, President and CEO of ACS, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,618k in 2013 that increased to 1,656k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO did not have long-term bonus between 2013 and 2017.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2010.** This is a stock option plan with the following characteristics:
    - Number of options: 936,430 options.
    - Strike price: €34.15.
    - Options grant date: 27 May 2010.
    - Exercise date: from 1 May 2013 till 30 April 2015.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

- **Plan 2014.** This is a stock option plan with the following characteristics:
  - Number of options: 540,950 options.
  - Strike price: €33.90.
  - Options grant date: 31 July 2014.
  - Exercise date: from 1 May 2015 till 30 April 2017.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2017, generating a €28k payoff.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.6 Aena SME, S.A.**

Aena SME, S.A. (hereinafter, **Aena**) is a Spanish company founded on 31 May 2011<sup>21</sup>. Aena is dedicated to managing “*general interest airports and heliports in Spain*”<sup>22</sup>. José Manuel Vargas Gómez was appointed as CEO of Aena on 20 January 2012, keeping this position until 26 September 2017.

---

<sup>21</sup> Informa Database (2020).

<sup>22</sup> Aena’s webpage (<http://www.aena.es/en/corporate/company-profile.html>).

The company went public on February 2015. Hence, there is no data available about Board Members' compensation before 2015.

The compensation of José Manuel Vargas Gómez, CEO of Aena, in 2016 (the only year of the Observation Period where the CEO did not change and where data is available for the whole year) was formed by:

- **Fixed salary.** The CEO had a fixed salary of €148k.
- **Short-term bonus.** The CEO had a short-term bonus.
- **Long-term bonus.** The CEO did not have any long-term bonus.
- **Share based compensation.** The CEO did not have any share based compensation.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.7 Amadeus IT Group, S.A.**

Amadeus IT Group, S.A. (hereinafter, **Amadeus**) is a Spanish company founded on 4 February 2005<sup>23</sup>. Amadeus is a “*provider of technology solutions for the travel industry*”<sup>24</sup>. Luis Maroto Camino was appointed as CEO of Amadeus in 2011, keeping

---

<sup>23</sup> Informa Database (2020).

<sup>24</sup> Amadeus' webpage (<https://corporate.amadeus.com/en/about-us>).

this position during the period between 1 January 2013 and 31 December 2017. Luis Maroto Camino became member of the Board of Directors in June 2014. Therefore, the IARCs has no information regarding the remuneration of Luis Maroto Camino before June 2014.

The compensation of Luis Maroto Camino, CEO of Amadeus, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €848k in 2015 that increased to 880k in 2017.
- **Short-term bonus.** The CEO had short-term bonus between 2015 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plans between 2015 and 2017:
  - **Plan 2013-2016.** This long-term bonus comprised the years 2013 – 2016 and the CEO received €2,852k under this plan.
  - **Plan 2014-2017.** This long-term bonus comprised the years 2014 – 2017 and the CEO received €2,728k under this plan.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Share based compensation.** The CEO had no share based compensation plans between 2015 and 2017.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### **7.1.8 Banco Bilbao Vizcaya Argentaria, S.A.**

Banco Bilbao Vizcaya Argentaria, S.A. (hereinafter, **BBVA**) is a Spanish company founded on 1 October 1988<sup>25</sup>. BBVA is a “*global financial group that operates a customer-focused retail business model, offering clients a comprehensive range of financial and non-financial products and services around the world*”<sup>26</sup>.

On 29 September 2009, the Board of Directors of BBVA appointed Angel Cano Fernandez as CEO of the company. Angel Cano Fernandez was CEO of BBVA from 29 September 2009 until 4 May 2015, when Carlos Torres Vila was appointed as CEO. Carlos Torres Vila was CEO of the company from 4 May 2015 until the end of the Observation Period.

The compensation of Angel Cano Fernandez in 2013 and 2014 was formed by:

---

<sup>25</sup> Informa Database (2020).

<sup>26</sup> BBVA’s webpage (<https://shareholdersandinvestors.bbva.com/bbva-group/bbva-in-brief/>).

- **Fixed salary.** Angel Cano Fernandez had a fixed salary of €1,748k in 2013 and 2014.
- **Short-term bonus.** Angel Cano Fernandez had a short-term bonus in 2013 and 2014.
- **Long-term bonus.** Angel Cano Fernandez did not have any long-term bonus in 2013 and 2014.
- **Share based compensation.** Regarding the share-based compensation:
  - The IARC tables of 2013 and 2014 include part of the short-term bonus as share based compensation because it was paid in company's shares. Hence, I re-classified these amounts as short term bonus.
- **Other concepts.** Angel Cano Fernandez received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Carlos Torres Vila in 2016 and 2017 was formed by:

- **Fixed salary.** Carlos Torres Vila had a fixed salary of €1,923k in 2016 that increased to €1,965k in 2017.
- **Short-term bonus.** Carlos Torres Vila had a short-term bonus in 2016 and 2017.  
Regarding the short-term bonus:

- The IARC tables of 2016 and 2017 include as short-term bonus amounts that were not accrued yet. In particular:
  - 50% of the 2016 short-term bonus was subject to achieving long-term objectives corresponding to the period 2017-2019.
  - 60% of the 2017 short-term bonus was subject to achieving long-term objectives corresponding to the period 2018-2020.

Consequently, I excluded the previous amounts from the 2016 and 2017 short-term bonus.

- **Long-term bonus.** Carlos Torres Vila had the following long-term bonus plans in 2016 and 2017:
  - **Plan 2016.** This long-term bonus comprised the years 2016 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Carlos Torres Vila.
  - **Plan 2017.** This long-term bonus comprised the years 2017 – 2020. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Carlos Torres Vila.
- **Share based compensation.** Regarding the share-based compensation:

- The IARC tables of 2016 and 2017 include part of the short-term bonus as share based compensation because it was paid in company's shares. Hence, I re-classified these amounts as short term bonus.
- Part of the short-term bonus was paid in restricted shares. Hence, I consider the compensation provided by these restricted shares.
- **Other concepts.** Carlos Torres Vila received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.9 Banco de Sabadell, S.A.

Banco de Sabadell, S.A. (hereinafter, **Sabadell**) is a Spanish company founded on 31 December 1881<sup>27</sup>. Sabadell is “Spain’s fourth largest private banking group”<sup>28</sup>. Jaime Guardiola Romojaro was appointed as CEO of Sabadell on 27 September 2007, keeping this position during the period between 1 January 2013 and 31 December 2017.

The compensation of Jaime Guardiola Romojaro, CEO of Sabadell, was formed by:

---

<sup>27</sup> Informa Database (2020).

<sup>28</sup> Sabadell’s webpage

([https://www.grupbancsabadell.com/en/XTD/INDEX/?url=/en/GRUPO/QUIENES\\_SOMOS/?menuid=9617&language=en](https://www.grupbancsabadell.com/en/XTD/INDEX/?url=/en/GRUPO/QUIENES_SOMOS/?menuid=9617&language=en)).

- **Fixed salary.** The CEO had a fixed salary of €1,246k in 2013 that increased to €1,313k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO did not have any long-term bonus between 2013 and 2017.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2010.** This is a stock option plan with the following characteristics:
    - Number of options: 2,000,000 options.
    - Strike price: €3.89.
    - Options grant date: 26 March 2009.
    - Exercise date: 28 June 2013.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

- **Plan 2014.** This is a stock option plan with the following characteristics:

- Number of options: 2,300,000 options, adjusted to 2,491,859 options after the capital increase of 27 April 2015.
- Strike price: €1.89, adjusted to €1.75 in 2015.
- Options grant date: 28 March 2014.
- Exercise date: 31 March 2017.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

- **Plan 2016.** This is a stock option plan with the following characteristics:

- Number of options: 1,400,000 options.
- Strike price: €1,49.
- Options grant date: 1 April 2016.
- Exercise date: 30 April 2019.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options did not vest at the end of the Observation Period.

- **Plan 2017.** This is a stock option plan with the following characteristics:
  - Number of options: 1,500,000 options.
  - Strike price: €1,35.
  - Options grant date: 30 March 2017.
  - Exercise date: 30 April 2020.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options did not vest at the end of the Observation Period.

- Part of the short-term bonus was paid in restricted shares. Hence, I consider the compensation provided by these restricted shares.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.10 Banco Popular, S.A.

Banco Popular, S.A. (hereinafter, **Popular**) was a Spanish company founded on 14 July 1926<sup>29</sup>. Popular was a Spanish bank that provided retail financial services. On the 7 June 2017, Popular was acquired by Banco Santander, S.A.

On 30 January 2013, the Board of Directors of Popular appointed Francisco Gomez Martin as CEO of the company. Francisco Gomez Martin was CEO of Popular from 30 January 2013 until 29 July 2016, when Pedro Larena Landeta was appointed as CEO. Pedro Larena Landeta was CEO of the company from 29 July 2016 until 7 June 2017, when Popular was acquired by Banco Santander, S.A.

The compensation of the CEO of Popular in 2014 and 2015 (the only years of the Observation Period where the CEO did not change) was formed by:

- **Fixed salary.** The CEO had a fixed salary of €900k in 2014 that increased to 950k in 2015.
- **Short-term bonus.** The CEO had a short-term bonus between 2014 and 2015.
- **Long-term bonus.** The CEO had the following long-term bonus plan between 2014 and 2015:

---

<sup>29</sup> Informa Database (2020).

- **Plan 2013.** This long-term bonus comprised the years 2013 – 2016. This long-term bonus plan did not provide any compensation to the CEO.
- **Share based compensation.** Regarding the share-based compensation:
  - The IARC tables of 2014 include part of the short-term bonus as share based compensation because it was paid in company’s shares. Hence, I reclassified these amounts as short term bonus.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.11 Banco Santander, S.A.**

Banco Santander, S.A. (hereinafter, **Santander**) is a Spanish company founded on 21 March 1857<sup>30</sup>. Santander is a Spanish bank that provides retail financial services. On 29 April 2013, the Board of Directors of Santander appointed Javier Marin Romano as CEO of the company. Javier Marin Romano was CEO of Santander from 29 April 2013 until 31 December 2014, when Jose Antonio Alvarez Alvarez was appointed as CEO. Jose Antonio Alvarez Alvarez was CEO of the company from 1 January 2015 until the end of the Observation Period.

---

<sup>30</sup> Informa Database (2020).

The compensation of Javier Marin Romano in 2014 (the only year of the Observation Period when he was the CEO for a complete year) was formed by:

- **Fixed salary.** Javier Marin Romano had a fixed salary of €2,000k in 2014.
- **Short-term bonus.** Javier Marin Romano had a short-term bonus in 2014.
- **Long-term bonus.** Javier Marin Romano had the following long-term bonus in 2014:
  - **Plan 2014 – 2015.** This long-term bonus comprised the years 2014 – 2015, and it did not provide any compensation to Javier Marin Romano.
  - **Plan 2014 – 2016.** This long-term bonus comprised the years 2014 – 2016, and it did not provide any compensation to Javier Marin Romano.
  - **Plan 2014 – 2017.** This long-term bonus comprised the years 2014 – 2017, and it did not provide any compensation to Javier Marin Romano.
- **Share based compensation.** Regarding the share-based compensation:
  - The 2014 IARC tables include part of the short-term bonus as share based compensation because it was paid in company’s shares. Hence, I re-classified these amounts as short term bonus.

- **Other concepts.** Javier Marin Romano received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Jose Antonio Alvarez Alvarez between 2015 and 2017 (the only years of the Observation Period when he was the CEO for the complete year) was formed by:

- **Fixed salary.** Jose Antonio Alvarez Alvarez had a fixed salary of €2,000k between 2015 and 2017.
- **Short-term bonus.** Jose Antonio Alvarez Alvarez had a short-term bonus between 2015 and 2017.
- **Long-term bonus.** Jose Antonio Alvarez Alvarez had the following long-term bonus between 2015 and 2017:
  - **Plan 2014 – 2017.** This long-term bonus comprised the years 2014 – 2017, and it did not provide any compensation to Jose Antonio Alvarez Alvarez.
  - **Plan 2015 – 2018.** This long-term bonus comprised the years 2015 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Jose Antonio Alvarez Alvarez.

- **Plan 2016 – 2022.** This long-term bonus comprised the years 2016 – 2022. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Jose Antonio Alvarez Alvarez.
- **Plan 2017 – 2023.** This long-term bonus comprised the years 2017 – 2023. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Jose Antonio Alvarez Alvarez.
- **Share based compensation.** Regarding the share-based compensation:
  - The IARC tables from 2015 till 2017 include part of the short-term bonus as share based compensation because it was paid in company’s shares. Hence, I re-classified these amounts as short term bonus.
- **Other concepts.** Jose Antonio Alvarez Alvarez received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.12 Bankia, S.A.

Bankia, S.A. (hereinafter, **Bankia**) is a Spanish company founded on 22 June 1983<sup>31</sup>. Bankia is a Spanish bank that provides retail financial services. On May 2012, Jose Sevilla Alvarez was appointed as the General Director of Bankia, developing the

---

<sup>31</sup> Informa Database (2020).

functions of the CEO. Jose Sevilla Alvarez developed the CEO role during the Observation Period.

The compensation of the CEO of Bankia during the Observation period was formed by:

- **Fixed salary.** The CEO had a fixed salary of €500k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2014 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plan between 2014 and 2017.
  - **Plan 2017.** This long-term bonus comprised the years 2017 – 2020. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO. Regarding this long-term bonus:
    - The IARC tables of 2017 include the maximum annual long-term bonus that would be granted if all the long-term objectives were met. Considering that the long-term bonus has not been accrued yet at the end of 2017, I excluded this amount from the analysis carried out.
- **Share based compensation.** Regarding the share-based compensation:

- The IARC tables of 2016 and 2017 include part of the short-term bonus as share based compensation because it was paid in company's shares. Hence, I re-classified these amounts as short term bonus.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.13 Bankinter, S.A.

Bankinter, S.A. (hereinafter, **Bankinter**) is a Spanish company founded on the 4 June 1965<sup>32</sup>. Bankinter is a “*financial institution whose corporate purpose is the performance of banking activity*”<sup>33</sup>.

On the 21 October 2010, the Board of Directors of Bankinter appointed María Dolores Dancausa Treviño as CEO of the company. María Dolores Dancausa Treviño was CEO of Bankinter between 1 January 2013 and 31 December 2017.

The compensation of María Dolores Dancausa Treviño, CEO of Bankinter, was formed by:

- **Fixed salary.** The fixed salary increased from €629k to €832k between 2013 and 2017.

---

<sup>32</sup> Informa Database (2020).

<sup>33</sup> Bankinter's webpage

([https://webcorporativa.bankinter.com/www2/corporativa/en/sobre\\_bankinter/informacion\\_societaria](https://webcorporativa.bankinter.com/www2/corporativa/en/sobre_bankinter/informacion_societaria)).

- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

- The amount of short-term bonus reported in the IARC table of 2017 is €151k and corresponds to the part of the short-term bonus paid in cash. The correct total amount of short-term bonus, including the amount paid in shares, is €303k.

- **Long-term bonus.** The CEO had the following long-term bonus plan during the Observation Period:

- **Plan 2016.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Share based compensation.** Regarding the share-based compensation:

- Part of the short-term bonus was paid in restricted shares. Hence, I consider the compensation provided by these shares as restricted share.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.14 Bolsas y Mercados Españoles, Sociedad Holding de Mercados y Sistemas Financieros, S.A.**

Bolsas y Mercados Españoles, Sociedad Holding de Mercados y Sistemas Financieros, S.A. (hereinafter, **BME**) is a Spanish company founded on 15 February 2002<sup>34</sup>. BME is the “operator of all stock Markets and financial systems in Spain”<sup>35</sup>.

On the 15 February 2002, the Board of Directors of BME appointed Antonio Zoido Martinez as President and CEO of the company. Antonio Zoido Martinez was President and CEO of BME between 1 January 2013 and 27 April 2017, when Javier Hernani Burzako was appointed as the CEO of the company.

The compensation of the CEO of BME between 2013 and 2016 (the years of the Observation Period where the CEO did not change) was formed by:

- **Fixed salary.** The CEO had a fixed salary of €732k between 2013 and 2016.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2016.
- **Long-term bonus.** The CEO had the following long-term bonus plans between 2013 and 2016:

---

<sup>34</sup> Informa Database (2020).

<sup>35</sup> BME’s webpage (<https://www.bolsasymercados.es/ing/About-BME/What-is-BME>).

- **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013 and the CEO received €452k under this plan.
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014 and the CEO received €574k under this plan.
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015 and the CEO received €382k under this plan.
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016 and the CEO received €388k under this plan.
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017 and the CEO received €347k under this plan.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** Regarding the share-based compensation:
- The IARC tables from 2013 till 2016 include the long-term bonus as share based compensation because it was paid in company’s shares. Hence, I reclassified these amounts as long term bonus.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.15 Caixabank, S.A.

Caixabank, S.A. (hereinafter, **Caixabank**) is a Spanish company founded on the 12 December 1980<sup>36</sup>. Caixabank is a “*financial group with a socially responsible, long-term universal banking model, based on quality, trust, and specialisation*”<sup>37</sup>.

On the 8 July 2011, the Board of Directors of Caixabank appointed Juan Maria Nin Genova as CEO of the company. Juan Maria Nin Genova was CEO of Caixabank between 1 January 2013 and 19 August 2014, when Gonzalo Gortazar Rotaeché was appointed as CEO. Gonzalo Gortazar Rotaeché was the CEO from 19 August 2014 until the end of the Observation Period.

The compensation of Juan Maria Nin Genova in 2013 (the only year of the Observation Period when he was the CEO for a complete year) was formed by:

- **Fixed salary.** Juan Maria Nin Genova had a fixed salary of €1,777k in 2013.
- **Short-term bonus.** Juan Maria Nin Genova had a short-term bonus in 2013.

---

<sup>36</sup> Informa Database (2020).

<sup>37</sup> Caixabank’s webpage ([https://www.caixabank.com/informacioncorporativa/quienessomos\\_en.html](https://www.caixabank.com/informacioncorporativa/quienessomos_en.html)).

- **Long-term bonus.** Juan Maria Nin Genova did not have any long-term bonus plan in 2013.
- **Share based compensation.** Regarding the share-based compensation:
  - Part of the short-term bonus was paid in restricted shares. Hence, I consider the compensation provided by these shares as restricted shares.
- **Other concepts.** Juan Maria Nin Genova received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Gonzalo Gortazar Rotaeché between 2015 and 2017 (the only years of the Observation Period when he was the CEO for the complete year) was formed by:

- **Fixed salary.** Gonzalo Gortazar Rotaeché had a fixed salary of €2,149k in 2015 that increased to €2,187k in 2017.
- **Short-term bonus.** Gonzalo Gortazar Rotaeché had a short-term bonus between 2015 and 2017.
- **Long-term bonus.** Gonzalo Gortazar Rotaeché had had the following long-term bonus plan:

- **Plan 2015.** This long-term bonus comprised the years 2015 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO. Regarding this long-term bonus:
  - The IARC tables from 2015 till 2017 include the maximum long-term bonus that could be accrued each year. However, the amount of the long-term bonus was subject to achieving the objectives in 2018. Therefore, no amount was accrued during the Observation Period. Hence, I adjusted the amounts included in the IARC tables to avoid considering amounts that were not accrued during the Observation Period.
- **Share based compensation.** Regarding the share-based compensation:
  - The IARC tables from 2015 till 2017 include part of the short-term bonus as share based compensation because it was paid in company’s shares. Hence, I re-classified these amounts as short term bonus.
- **Other concepts.** Gonzalo Gortazar Rotaecche received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.16 Cellnex Telecom, S.A.

Cellnex Telecom, S.A. (hereinafter, **Cellnex**) is a Spanish company founded on the 25 June 2008<sup>38</sup>. Cellnex is the “*main infrastructure operator for wireless telecommunication in Europe*”<sup>39</sup>. On the 17 November 2014, the Board of Directors of Cellnex appointed Tobias Martinez Gimeno as CEO of the company. Tobias Martinez Gimeno was the CEO from 17 November 2014 until the end of the Observation Period.

Cellnex went public on the 6 May 2015. Therefore, 2016 and 2017 are the only complete years of the Observation Period with data regarding the value created for shareholders measured as stock price increase.

The compensation of the CEO of Cellnex was formed by:

- **Fixed salary.** The CEO had a fixed salary of €600k in 2016, that increased to €700k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2016 and 2017.

Regarding the short-term bonus plan:

- The IARC table of 2016 includes €300k as the short-term bonus for this year. However, the text of the IARC of 2016 specifies that the short-term

---

<sup>38</sup> Informa Database (2020).

<sup>39</sup> Cellnex’s webpage (<https://www.cellnextelecom.com/en/who-we-are/>).

bonus amounted to €334k. Hence, I corrected the amount of the short-term bonus included in the IARC table of 2016.

- **Long-term bonus.** The CEO had the following long-term bonus plan during 2016 and 2017:
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017. This long-term bonus plan did not provide any compensation to the CEO.
- **Share based compensation.** The CEO had no share based compensation plans in 2016 and 2017.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.17 Distribuidora Internacional de Alimentacion, S.A.**

Distribuidora Internacional de Alimentacion, S.A. (hereinafter, **DIA**) is a Spanish company founded on the 24 July 1966<sup>40</sup>. DIA is an “*is an international food retailer*”<sup>41</sup>.

On the 1 May 2009, the Board of Directors of DIA appointed Ricardo Curras De Don Pablos as CEO of the company. Ricardo Curras De Don Pablos was CEO during the Observation Period.

---

<sup>40</sup> Informa Database (2020).

<sup>41</sup> DIA’s webpage (<https://www.diacorporate.com/en/about-us/>).

The compensation of the CEO of DIA was formed by:

- **Fixed salary.** The CEO had a fixed salary of €456k in 2013, that increased to €600k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2011-2014.** This long-term bonus comprised the years 2011 – 2014 and the CEO received €3,574k under this plan.
    - The tables reported by DIA include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016 and the CEO did not receive any compensation under this plan.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.18 Ebro Foods, S.A.

Ebro Foods, S.A. (hereinafter, **Ebro**) is a Spanish company founded on the 11 May 1998<sup>42</sup>. Ebro is the “*largest food group in Spain, world leaders in rice production and second global fresh and dry pasta manufacturers*”<sup>43</sup>.

On the 23 March 2004, the Board of Directors of Ebro appointed Antonio Hernandez Callejas as CEO of the company. Antonio Hernandez Callejas was CEO and President of Ebro during the Observation Period.

The compensation of Antonio Hernandez Callejas was formed by:

- **Fixed salary.** The CEO had a fixed salary of €690k in 2013 that increased to €1,027k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

---

<sup>42</sup> Informa Database (2020).

<sup>43</sup> Ebro’s webpage (<https://www.ebrofoods.es/en/about-ebro/>).

- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015 and the CEO received €1,464k under this plan.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.19 Enagas, S.A.**

Enagas, S.A. (hereinafter, **Enagas**) is a Spanish company founded on the 13 July 1972<sup>44</sup>. Enagas is an “*international standard bearer in the development, operation and maintenance of gas infrastructures*”<sup>45</sup>.

---

<sup>44</sup> Informa Database (2020).

<sup>45</sup> Enagas’s webpage (<https://www.enagas.es/enagas/en/QuienesSomos/Presentacion>).

On the 17 September 2012, the Board of Directors of Enagas appointed Marcelino Oreja Arburúa as CEO of the company. Marcelino Oreja Arburúa was CEO of Enagas between 1 January 2013 and 31 December 2017.

The compensation of Marcelino Oreja Arburúa, CEO of Enagas, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €300k between 2013 and 2015, increasing to €390k in 2016 and to €460k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

- The IARC tables from 2013 till 2017 include the short-term bonus accrued during the previous year. Hence, I adjusted the short-term bonus compensation of these tables to reflect the short-term bonus accrued in each of the years at consideration.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2016.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.20 Endesa, S.A.

Endesa, S.A. (hereinafter, **Endesa**) is a Spanish company founded on the 18 November 1944<sup>46</sup>. Endesa is “*the leading company in the Spanish electricity sector and the second-biggest operator in the electricity market in Portugal*”<sup>47</sup>.

On the 18 March 2009, the Board of Directors of Endesa appointed Andrea Brentan as CEO of the company. Andrea Brentan was CEO of Endesa between 18 March 2009 and 7 October 2014, when Jose Damian Bogas Galvez was appointed as CEO. Jose Damian Bogas Galvez was the CEO from 7 October 2014 until the end of the Observation Period.

The compensation of Andrea Brentan in 2013 (the only year of the Observation Period when he was the CEO for a complete year) was formed by:

- **Fixed salary.** Andrea Brentan had a fixed salary of €710k in 2013.
- **Short-term bonus.** Andrea Brentan had a short-term bonus in 2013.

---

<sup>46</sup> Informa Database (2020).

<sup>47</sup> Endesa’s webpage (<https://www.endesa.com/content/endesa-com/en/about-endesa/who-we-are>).

- **Long-term bonus.** Andrea Brentan had the following long-term bonus plans during the Observation Period:
  - **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013 and Andrea Brentan received €568k under this plan.
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014. Andrea Brentan did not receive any compensation under this plan.
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015. Andrea Brentan did not receive any compensation under this plan.
- **Share based compensation.** Andrea Brentan had no share based compensation plans in 2013.
- **Other concepts.** Andrea Brentan received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Jose Damian Bogas Galvez between 2015 and 2017 (the only years of the Observation Period when he was the CEO for the complete year) was formed by:

- **Fixed salary.** Jose Damian Bogas Galvez had a fixed salary of €672k in 2015 that increased to €737k in 2017.

- **Short-term bonus.** Jose Damian Bogas Galvez had a short-term bonus between 2015 and 2017.
  
- **Long-term bonus.** Jose Damian Bogas Galvez had the following long-term bonus plans between 2015 and 2017:
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015 and Jose Damian Bogas Galvez received €403k under this plan.
  
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016 and Jose Damian Bogas Galvez received €705k under this plan.
  
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017 and Jose Damian Bogas Galvez received €846k under this plan.
  
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Jose Damian Bogas Galvez.
  
  - **Plan 2017-2019.** This long-term bonus comprised the years 2017 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to Jose Damian Bogas Galvez.
  
- **Share based compensation.** Jose Damian Bogas Galvez had no share based compensation plans between 2015 and 2017.

- **Other concepts.** Jose Damian Bogas Galvez received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.21 Ferrovial, S.A.

Ferrovial, S.A. (hereinafter, **Ferrovial**) is a Spanish company founded on the 3 February 1998<sup>48</sup>. Ferrovial is “*one of the world’s leading infrastructure operators and municipal services companies, committed to developing sustainable solutions*”<sup>49</sup>.

On the 9 January 1992, the Board of Directors of Ferrovial appointed Rafael del Pino y Calvo-Sotelo as CEO of the company. Rafael del Pino y Calvo-Sotelo was CEO and Executive President of Ferrovial during the Observation Period.

The compensation of Rafael del Pino y Calvo-Sotelo, CEO and Executive President of Ferrovial, was formed by:

- **Fixed salary.** The CEO had a fixed salary that increased from €1,175k to €1,455k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

---

<sup>48</sup> Informa Database (2020).

<sup>49</sup> Ferrovial’s webpage (<https://www.ferrovial.com/en/company/about-us/>).

– **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:

○ **Plan 2011.** This long-term bonus comprised the years 2011 – 2013. This long-term bonus provided a compensation of €2,054k. Regarding this long-term bonus:

▪ The tables reported by Ferrovial include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.

○ **Plan 2012.** This long-term bonus comprised the years 2012 – 2014. This long-term bonus provided a compensation of €2,323k. Regarding this long-term bonus:

▪ The tables reported by Ferrovial include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.

- **Plan 2013.** This long-term bonus comprised the years 2013 – 2015. This long-term bonus provided a compensation of €1,918k. Regarding this long-term bonus:
  - The tables reported by Ferrovial include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
  
- **Plan 2014.** This long-term bonus comprised the years 2014 – 2016. This long-term bonus provided a compensation of €1,406k. Regarding this long-term bonus:
  - The tables reported by Ferrovial include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
  
- **Plan 2015.** This long-term bonus comprised the years 2015 – 2017. This long-term bonus provided a compensation of €1,204k. Regarding this long-term bonus:

- The tables reported by Ferrovial include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
- **Plan 2016.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Plan 2017.** This long-term bonus comprised the years 2017 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2006.** This is a stock option plan with the following characteristics:
    - Number of options: 786,400 options.
    - Strike price: €15.94.
    - Options grant date: 31 March 2006.
    - Exercise date: from 31 March 2009 till 31 March 2014.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options expired without being exercised.

○ **Plan 2008.** This is a stock option plan with the following characteristics:

- Number of options: 1,179,600 options.
- Strike price: €11.69.
- Options grant date: 28 March 2008.
- Exercise date: from 28 March 2011 till 28 March 2016.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2016, generating a €9,383k payoff.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.22 Fomento de Construcciones y Contratas, S.A.

Fomento de Construcciones y Contratas, S.A. (hereinafter, **FCC**) is a Spanish company founded on the 14 October 1944<sup>50</sup>. FCC is a “*global reference in the environmental services, water and infrastructure sectors*”<sup>51</sup> and it has more than “*100 years’ experience delivering services to citizens all over the world*”<sup>52</sup>.

On 31 January 2013, the Board of Directors of FCC appointed Juan Béjar Ochoa as CEO of the company. Juan Béjar Ochoa was CEO of FCC from 31 January 2013 until 18 August 2015, when Carlos Manuel Jarque was appointed as CEO. Carlos Manuel Jarque was CEO of the company from 18 August 2015 until 12 September 2017, when Pablo Colio Abril was appointed as CEO. Pablo Colio Abril was CEO of the company from 12 September 2017 until the end of the Observation Period.

The compensation of Juan Béjar Ochoa, CEO of FCC between 31 January 2013 and 18 August 2015, was formed by:

- **Fixed salary.** Juan Béjar Ochoa had a fixed salary of €2,500k between 2013 and 2015.

---

<sup>50</sup> Informa Database (2020).

<sup>51</sup> FCC’s webpage (<https://www.fcc.es/en/-que-es-fcc>).

<sup>52</sup> FCC’s webpage (<https://www.fcc.es/en/-que-es-fcc>).

- **Short-term bonus.** Juan Béjar Ochoa had a short-term bonus between 2013 and 2015. Regarding the short-term bonus:
  - The IARC tables of 2014 include the short-term bonus accrued in the previous year. Hence, I adjusted the short-term bonus compensation of these tables, assigning the amount actually accrued in 2013 to the 2013 compensation.
- **Long-term bonus.** Juan Béjar Ochoa had the following long-term bonus between 2013 and 2015.
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015 and the CEO did not receive any compensation under this plan.
- **Share based compensation.** Juan Béjar Ochoa had no share based compensation plans during the Observation Period.
- **Other concepts.** Juan Béjar Ochoa received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Carlos Manuel Jarque, CEO of FCC from 18 August 2015 until 12 September 2017, was formed by:

- **Fixed salary.** Carlos Manuel Jarque had a fixed salary of €900k between 2015 and 2017.
- **Short-term bonus.** Carlos Manuel Jarque had a short-term bonus between 2015 and 2017.
- **Long-term bonus.** Carlos Manuel Jarque had no long-term bonus between 2015 and 2017.
- **Share based compensation.** Carlos Manuel Jarque had no share based compensation plans between 2015 and 2017.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Pablo Colio Abril, CEO of FCC from 12 September 2017 until the end of the Observation Period, was formed by:

- **Fixed salary.** Pablo Colio Abril had a fixed salary of €525k in 2017.
- **Short-term bonus.** Pablo Colio Abril had a short-term bonus in 2017.
- **Long-term bonus.** Pablo Colio Abril had no long-term bonus in 2017.
- **Share based compensation.** Pablo Colio Abril had no share based compensation plans in 2017.

- **Other concepts.** Pablo Colio Abril received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.23 Grifols, S.A.

Grifols, S.A. (hereinafter, **Grifols**) is a Spanish company founded on the 22 June 1987<sup>53</sup>. Grifols is a “*global healthcare company*”<sup>54</sup>.

In 1985, the Board of Directors of Grifols appointed Victor Grifols Roura as CEO of the company. Victor Grifols Roura was CEO and President of Grifols between 1 January 2013 and 31 December 2016, when Victor Grifols Deu was appointed as CEO. Victor Grifols Deu was CEO of the company from 1 January 2017 until the end of the Observation Period.

The compensation of Victor Grifols Roura, CEO of Grifols between 1 January 2013 and 31 December 2016, was formed by:

- **Fixed salary.** Victor Grifols Roura had a fixed salary of €839k in 2013 that increased to €934k in 2016.

---

<sup>53</sup> Informa Database (2020).

<sup>54</sup> Grifols’ webpage (<https://www.grifols.com/en/company>).

- **Short-term bonus.** Victor Grifols Roura had short-term bonus between 2013 and 2016.
- **Long-term bonus.** Victor Grifols Roura had no long-term bonus between 2013 and 2016.
- **Share based compensation.** Victor Grifols Roura had no share based compensation plans between 2013 and 2016.
- **Other concepts.** Victor Grifols Roura did not receive any additional compensation.

The compensation of Victor Grifols Deu, CEO of Grifols from 1 January 2017 until the end of the Observation Period, was formed by:

- **Fixed salary.** Victor Grifols Deu had a fixed salary of €880k in 2017.
- **Short-term bonus.** Victor Grifols Deu had short-term bonus in 2017.
- **Long-term bonus.** Victor Grifols Deu had no long-term bonus in 2017.
- **Share based compensation.** Victor Grifols Deu had no share based compensation plans in 2017.
- **Other concepts.** Victor Grifols Deu did not receive any additional compensation.

#### 7.1.24 Iberdrola, S.A.

Iberdrola, S.A. (hereinafter, **Iberdrola**) is a Spanish company founded on the 19 July 1991<sup>55</sup>. Iberdrola is “a global energy leader, the number one producer of wind power, and one of the world's biggest electricity utilities in terms of market capitalisation”<sup>56</sup>.

On the 21 May 2001, the Board of Directors of Iberdrola appointed Jose Ignacio Sanchez Galan as CEO and President of the company. Jose Ignacio Sanchez Galan was CEO and President of Iberdrola during the Observation Period.

The compensation of Jose Ignacio Sanchez Galan, CEO and President of Iberdrola, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €2,250k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:

- **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013. This long-term bonus provided a compensation of €2,957k. Regarding this long-term bonus:

---

<sup>55</sup> Informa Database (2020).

<sup>56</sup> Ferrovial’s webpage (<https://www.iberdrola.com/about-us>).

- The tables reported by Iberdrola include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016. This long-term bonus provided a compensation of €3,423k. Regarding this long-term bonus:
    - The tables reported by Iberdrola include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
  - **Plan 2017-2019.** This long-term bonus comprised the years 2017 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.25 Indra Sistemas, S.A.

Indra Sistemas, S.A. (hereinafter, **Indra**) is a Spanish company founded on the 6 November 1979<sup>57</sup>. Indra is “*one of the leading global technology and consulting companies and the technological partner for core business operations of its customers world-wide*”<sup>58</sup>.

On the 21 June 2011, the Board of Directors of Indra appointed Javier de Andrés Gonzalez as CEO of the company. Javier de Andrés Gonzalez was CEO of Indra between 1 January 2013 and 21 December 2017.

The compensation of Javier de Andrés Gonzalez, CEO of Indra, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €450k in 2013 that increased to €550k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

---

<sup>57</sup> Informa Database (2020).

<sup>58</sup> Indra’s webpage (<https://www.indracompany.com/en/indra>).

- The tables reported by Indra include part of the short-term bonus as share based compensation because part of this bonus was paid in shares. In the analysis, I included this compensation as short-term bonus, instead of share based compensation.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013. This long-term bonus provided a compensation of €1,350k. Regarding this long-term bonus:
    - The tables reported by Indra include the compensation associated with this long-term bonus as share based compensation because this bonus was paid in shares of the company. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017. This long-term bonus provided a compensation of €2,263k. Regarding this long-term bonus:
    - The tables reported by Indra include the compensation associated with this long-term bonus as share based compensation because

this bonus was paid in shares of the company. In the analysis, I included this compensation as long-term bonus, instead of share based compensation.

- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.26 Industria de Diseño Textil, S.A.**

Industria de Diseño Textil, S.A. (hereinafter, **Inditex**) is a Spanish company founded on the 14 November 1979<sup>59</sup>. Inditex is “*one of the world's largest fashion retailers, with eight brands (Zara, Pull&Bear, Massimo Dutti, Bershka, Stradivarius, Oysho, Zara Home and Uterqüe) selling in 202 markets through its online platform or its over 7,000 stores in 96 markets*”<sup>60</sup>.

On the 9 Junio 2005, the Board of Directors of Inditex appointed Pablo Isla Alvarez de Tejera as CEO of the company. Pablo Isla Alvarez de Tejera was the CEO of Inditex during the Observation Period.

---

<sup>59</sup> Informa Database (2021).

<sup>60</sup> Inditex’s webpage (<https://www.inditex.com/en/about-us/who-we-are>).

The compensation of Pablo Isla Alvarez de Tejera, CEO of Inditex, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €3,250k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2015.** This long-term bonus comprised the period from the 1 February 2013 until 31 January 2015. This long-term bonus provided a compensation of €1,980k.
  - **Plan 2013-2016.** This long-term bonus comprised the period from the 1 February 2013 until 31 January 2016. This long-term bonus provided a compensation of €5,520k.
  - **Plan 2016-2019.** This long-term bonus comprised the period from the 1 February 2016 until 31 January 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period.

- **Plan 2013-2016.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 26,000 restricted shares.
  - Restricted shares grant date: 1 July 2013.
  - Restricted shares grant price: €97.59.
  - Restricted shares vesting date: 30 June 2016.
  - Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Inditex. The comparable companies are those that belonged to the DJ Retail Titans 30 Index. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
    - If Inditex's percentile was worse than the median, no restricted share would consolidate.
    - If Inditex's percentile was the median, 30% of restricted shares would consolidate.
    - If Inditex's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the DJ Retail Titans 30 Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested on 30 June 2016, generating a €3,395k payoff.

- **Plan 2014-2017.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 34,000 restricted shares.
  - Restricted shares grant date: 1 July 2014.
  - Restricted shares grant price: €112.45.
  - Restricted shares vesting date: 30 June 2017.
  - Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Inditex. The comparable companies are those that belonged to the DJ Retail Titans 30 Index. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
    - If Inditex's percentile was worse than the median, no restricted share would consolidate.

- If Inditex's percentile was the median, 30% of restricted shares would consolidate.
- If Inditex's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the DJ Retail Titans 30 Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested on 30 June 2017, generating a €4,120k payoff.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.27 Inmobiliaria Colonial, SOCIMI, S.A.**

Inmobiliaria Colonial, SOCIMI, S.A. (hereinafter, **Colonial**) is a Spanish company founded on the 8 November 1956<sup>61</sup>. Colonial is a real estate company that “*has one of*

---

<sup>61</sup> Informa Database (2021).

*the most important real estate asset portfolios in Europe for office rentals, with a significant presence in prime zones in the Paris, Madrid and Barcelona markets”<sup>62</sup>.*

On the 18 July 2008, the Board of Directors of Colonial appointed Pedro Viñolas Serra as CEO of the company. Pedro Viñolas Serra was the CEO of Colonial during the Observation Period.

The compensation of Pedro Viñolas Serra, CEO of Colonial, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €444k in 2013 that increased to €650k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2014-2021.** This long-term bonus comprised the years 2014 – 2021. This long-term bonus provided an annual compensation that was paid in restricted shares that vested after 3-years.
- **Share based compensation.** The CEO had share based compensation corresponding to the long-term bonus that was paid in shares of the company.

---

<sup>62</sup> Colonial’s webpage (<https://www.inmocolonial.com/en/assets/office-buildings>).

These shares were restricted shares as far as the CEO could not sell them during a 3-year period.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.28 International Consolidated Airlines Group, S.A.

International Consolidated Airlines Group, S.A. (hereinafter, **IAG**) is a Spanish company founded on the 17 December 2009<sup>63</sup> following the merge of Iberia and British Airways. IAG is *“one of the world's largest airline groups with 598 aircraft flying to 279 destinations and carrying around 118 million passengers each year”*<sup>64</sup>.

On the 24 January 2011, the Board of Directors of IAG appointed Willie Walsh as CEO of the company. Willie Walsh was the CEO during the Observation Period.

The compensation of Willie Walsh, CEO of IAG, was formed by:

- **Fixed salary.** The CEO had a fixed salary of £850k between 2013 and 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

---

<sup>63</sup> Informa Database (2021).

<sup>64</sup> IAG’s webpage (<https://www.iairgroup.com/en/the-group/iag-overview>).

- The IARC tables from 2013 till 2017 only include the part of the short-term bonus that is paid in cash (which corresponds to 50% of the total bonus amount). Hence, I adjusted the short-term bonus compensation of these tables to reflect the short-term bonus accrued in each of the years at consideration.
  
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013. This long-term bonus provided a compensation of €3,376k.
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014. This long-term bonus provided a compensation of €6,619k.
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015. This long-term bonus provided a compensation of €4,565k.
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016. This long-term bonus provided a compensation of €1,192k.
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Plan 2017-2019.** This long-term bonus comprised the years 2017 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.
- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.29 Jazztel, P.L.C.

Jazztel, P.L.C. (hereinafter, **Jazztel**) is a British company founded on July 1998<sup>65</sup> that was listed in the Spain's Stock Exchange from December 2000<sup>66</sup> until August 2015<sup>67</sup>. For this reason, the IAGCs and IARCs of Jazztel are only available for 2013 and 2014 during the Observation Period. Jazztel is a provider of telecommunication services.

---

<sup>65</sup> <https://www.telefonica.com/documents/336872/382754/abril2005.pdf/1ed8850a-a2ad-4443-9df9-605b599f28db>

<sup>66</sup> Bloomberg.

<sup>67</sup> Expansion webpage

(<https://www.expansion.com/mercados/2015/08/04/55c0616de2704eb8168b456e.html>).

On the 6 November 2006, the Board of Directors of Jazztel appointed Jose Miguel García Fernandez as CEO of the company. Jose Miguel García Fernandez was the CEO of Jazztel between 1 January 2013 and 31 December 2014 (the company was unlisted in the Spain's Stock Exchange during 2015, so no additional observations are available for this company).

The compensation of Jose Miguel García Fernandez, CEO of Jazztel, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €201k in 2013 and 2014.
- **Short-term bonus.** The CEO had a short-term bonus in 2013 and 2014.
- **Long-term bonus.** The CEO did not have any long-term bonus plan in 2013 and 2014.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2012-2014.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 324,823 restricted shares.
    - Restricted shares grant date: 27 June 2012.
    - Restricted shares grant price: €4.33.

- Restricted shares vesting date: 31 May 2014.
  - Vesting conditions: continuing working for the company.
- **Plan 2013-2018.** This is a restricted shares plan with the following characteristics:
- Number of restricted shares: 1,000,000 restricted shares.
  - Restricted shares grant date: 13 June 2013.
  - Restricted shares grant price: €5.74.
  - Restricted shares vesting date: 13 May 2018.
  - Vesting conditions: continuing working for the company.
- **Plan 2008-2012.** This is a stock option plan with the following characteristics:
- Number of options: 180,000 options.
  - Strike price: €1.80.
  - Options grant date: 25 April 2008.
  - Exercise date: 31 March 2013.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2013, generating a €741k payoff.

- **Plan 2010-2014.** This is a stock option plan with the following characteristics:

- Number of options: 1,400,000 options.
- Strike price: €1.80.
- Options grant date: 10 June 2010.
- Exercise date: 31 May 2014.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2014, generating a €10,959k payoff.

- **Plan 2012-2016.** This is a stock option plan with the following characteristics:

- Number of options: 600,000 options.
- Strike price: €4.33.

- Options grant date: 27 June 2012.
- Exercise date: from 1 January 2014 till 20 May 2017.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were not exercised yet at the end of the Observation Period.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.30 Mapfre, S.A.

Mapfre, S.A. (hereinafter, **Mapfre**) is a Spanish company founded on the 4 March 1984<sup>68</sup>. Mapfre is “a global insurance company”<sup>69</sup>.

On the 10 March 2012, the Board of Directors of Mapfre appointed Antonio Huertas Mejias as Executive President of the company. This position is the closest one to the CEO position in Mapfre’s organization chart. Antonio Huertas Mejias was Executive President of Mapfre between 1 January 2013 and 31 December 2017.

---

<sup>68</sup> Informa Database (2021).

<sup>69</sup> Mapfre’s webpage (<https://www.mapfre.com/en/who-we-are/>).

The compensation of Antonio Huertas Mejias, Executive President of Mapfre, was formed by:

- **Fixed salary.** Antonio Huertas Mejias had a fixed salary of €565k in 2013 that increased to €812k in 2017.
- **Short-term bonus.** Antonio Huertas Mejias had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** Antonio Huertas Mejias had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2016.** This long-term bonus comprised the years 2013 – 2016. This long-term bonus provided a compensation of €2,880k.
  - **Plan 2016-2019.** This long-term bonus comprised the years 2016 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Share based compensation.** Antonio Huertas Mejias had no share based compensation plans during the Observation Period.
- **Other concepts.** Antonio Huertas Mejias received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.31 Mediaset España Comunicación, S.A.

Mediaset España Comunicación, S.A. (hereinafter, **Mediaset**) is a Spanish company founded on the 10 March 1989<sup>70</sup>. Mediaset is “a set of companies engaged in business related to the audio-visual sector”<sup>71</sup>, which main activity consists in “the sale of advertising across various distribution platforms including TV, Internet and Digital”<sup>72</sup>.

On the 30 March 1999, the Board of Directors of Enagas appointed Paolo Vasile as CEO of the company. Paolo Vasile was CEO of Mediaset during the Observation Period.

The compensation of Paolo Vasile, CEO of Mediaset, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €831k in 2013 that increased to €930k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

---

<sup>70</sup> Informa Database (2020).

<sup>71</sup> Mediaset’s webpage ([https://www.mediaset.es/inversores/en/Mediaset-Espana-Who-is-who\\_0\\_1348200361.html](https://www.mediaset.es/inversores/en/Mediaset-Espana-Who-is-who_0_1348200361.html)).

<sup>72</sup> Mediaset’s webpage ([https://www.mediaset.es/inversores/en/Mediaset-Espana-Who-is-who\\_0\\_1348200361.html](https://www.mediaset.es/inversores/en/Mediaset-Espana-Who-is-who_0_1348200361.html)).

- The IARC tables of 2016 refers to a discretionary short-term bonus of €100k corresponding to the performance in 2015. This discretionary bonus is classified as “*other concept*” in the IARC tables of 2016. In the analysis, I reclassified this amount as short-term bonus of 2015.
- **Long-term bonus.** The CEO did not have any long-term bonus during the Observation Period.
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Plan 2008.** This is a stock option plan with the following characteristics:
    - Number of options: 67,250 options.
    - Strike price: €7.13.
    - Options grant date: 30 July 2008.
    - Exercise date: from 30 July 2011 till 29 July 2013.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2013, generating a €25k payoff.

- **Plan 2009.** This is a stock option plan with the following characteristics:

- Number of options: 33,625 options.
- Strike price: €5.21.
- Options grant date: 29 July 2009.
- Exercise date: from 29 July 2012 till 28 July 2014.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2014, generating a €130k payoff.

- **Plan 2010.** This is a stock option plan with the following characteristics:
  - Number of options: 134,500 options.
  - Strike price: €7.00.
  - Options grant date: 28 July 2010.
  - Exercise date: from 28 July 2013 till 27 July 2015.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2015, generating a €700k payoff.

- **Plan 2011.** This is a stock option plan with the following characteristics:

- Number of options: 67,250 options.
- Strike price: €5.83.
- Options grant date: 27 July 2011.
- Exercise date: from 27 July 2014 till 26 July 2016.

I valued these options applying the Monte Carlo approach, using the financial valuation model included in Appendix I.

These options were exercised in 2016, generating a €321k payoff.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.32 Melia Hotels International, S.A.

Melia Hotels International, S.A. (hereinafter, **Melia**) is a Spanish company founded on the 24 June 1986<sup>73</sup>. Melia is *“the leading hotel Company in Spain and one of the largest in the world, with seven well-known brands and more than 380 hotels on four continents”*<sup>74</sup>.

---

<sup>73</sup> Informa Database (2021).

<sup>74</sup> Melia’s webpage (<https://www.meliahotelsinternational.com/en/our-company/about-us>).

On April 2009, the Board of Directors of Melia appointed Gabriel Juan Escarrer Jaume as CEO of the company. Gabriel Juan Escarrer Jaume was CEO of Melia between 1 January 2013 and 31 December 2017.

The compensation of Gabriel Juan Escarrer Jaume, CEO of Melia, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €298k in 2013 that increased to €732k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

Regarding the short-term bonus:

- The IARC tables from 2013 till 2017 include the short-term bonus accrued during the previous year. Hence, I adjusted the short-term bonus compensation of these tables to reflect the short-term bonus accrued in each of the years at consideration.
- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014. This long-term bonus provided a compensation of €497k.

- **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
  
- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
  
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.33 Merlin Properties, SOCIMI, S.A.

Merlin Properties, SOCIMI, S.A. (hereinafter, **Merlin**) is a Spanish company founded on the 25 March 2014<sup>75</sup>. Merlin is “*one of the leading real estate companies*” that is “*focused on the acquisition and management of commercial assets in the Iberian Peninsula*”<sup>76</sup>.

Merlin began to be quoted in the Spanish Stock Exchange on the 30 June 2014<sup>77</sup>. Consequently, there is no public information regarding Merlin’s CEO compensation before 2014.

---

<sup>75</sup> Informa Database (2021).

<sup>76</sup> Merlin’s webpage (<https://www.merlinproperties.com/en/who-we-are/the-company/>).

<sup>77</sup> Cinco Dias’ webpage ([https://cincodias.elpais.com/cincodias/2019/04/12/mercados/1555064209\\_471638.html](https://cincodias.elpais.com/cincodias/2019/04/12/mercados/1555064209_471638.html)).

On 27 May 2014, the Board of Directors of Merlin appointed Ismael Clemente Orrego as President and CEO of the company. Ismael Clemente Orrego was President and CEO of Merlin between 27 May 2014 and the end of the Observation Period.

The compensation of Ismael Clemente Orrego, CEO of Merlin, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €300k in 2015 that increased to €1,000k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2015 and 2017.

Regarding the short-term bonus:

- The IARC tables of 2016 and 2017 include part of the short-term bonus as share-based compensation (restricted shares) because part of the short-term bonus is paid in restricted shares. Hence, I adjusted the short-term bonus compensation of these tables to reflect the correct amount of short-term bonus received by the CEO (regardless this amount was paid in cash or in restricted shares).
- **Long-term bonus.** The CEO had the following long-term bonus plan:
  - **Plan 2017-2019.** This long-term bonus comprised the years 2017 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation to the CEO.

- **Share based compensation.** Part of the CEO’s short-term bonus of 2016 and 2017 was paid in restricted shares. These restricted shares will vest in 2023.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.34 Naturgy Energy Group, S.A.

Naturgy Energy Group, S.A. (hereinafter, **Naturgy**) is a Spanish company founded on the 1 January 1843<sup>78</sup>. Naturgy is an energy group that operates “*in regulated and deregulated gas and electricity markets*” in more than 20 countries<sup>79</sup>.

On 28 January 2005, the Board of Directors of Naturgy appointed Rafael Villaseca Marco as CEO of the company. Rafael Villaseca Marco was CEO of Naturgy during the Observation Period.

The compensation of Rafael Villaseca Marco, CEO of Naturgy, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,043k in 2013 that increased to €1,285k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.

---

<sup>78</sup> Informa Database (2021).

<sup>79</sup> Naturgy’s webpage ([https://www.naturgy.com/en/about\\_us/the\\_group](https://www.naturgy.com/en/about_us/the_group)).

- **Long-term bonus.** The CEO had the following long-term bonus plans during the Observation Period:
  - **Plan 2011-2013.** This long-term bonus comprised the years 2011 – 2013. This long-term bonus provided a compensation of €838k.
  - **Plan 2012-2014.** This long-term bonus comprised the years 2012 – 2014. This long-term bonus provided a compensation of €902k.
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015. This long-term bonus provided a compensation of €883k.
  - **Plan 2014-2016.** This long-term bonus comprised the years 2014 – 2016. This long-term bonus provided a compensation of €860k.
  - **Plan 2015-2017.** This long-term bonus comprised the years 2015 – 2017. This long-term bonus provided a compensation of €757k.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. The Board of Directors liquidated this plan before its expiration, providing a compensation of €589k to the CEO according to 2017 IARC.
  - **Plan 2017-2019.** This long-term bonus comprised the years 2017 – 2019. The Board of Directors liquidated this plan before its expiration, providing a compensation of €309k to the CEO according to 2017 IARC.

- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### **7.1.35 Obrascon Huarte Lain, S.A.**

Obrascon Huarte Lain, S.A. (hereinafter, **OHL**) is a Spanish company founded on the 15 May 1911<sup>80</sup>. OHL “*is a global infrastructure group*” whose activity is “*focused in three geographical areas: USA, Europe and Latin America*”<sup>81</sup>.

On the 1 October 2013, the Board of Directors of OHL appointed Josep Pique Camps as CEO of the company. Josep Pique Camps was CEO of OHL between 1 October 2013 and 23 June 2016, when Tomas Garcia Madrid was appointed as CEO. Tomas Garcia Madrid was the CEO from 23 June 2016 until 25 October 2017, when Juan Luis Osuna Gomez was appointed as CEO. Juan Luis Osuna Gomez was the CEO from 25 October 2017 until the end of the Observation Period.

The only CEO of OHL that occupied the CEO position for a complete year during the Observation Period was Josep Pique Camps in 2014 and 2015. The compensation of Josep Pique Camps during these years was formed by:

---

<sup>80</sup> Informa Database (2021).

<sup>81</sup> OHL’s webpage (<https://www.ohl.es/en/about-us/presentation/>).

- **Fixed salary.** Josep Pique Camps had a fixed salary of €517k in 2014 that decreased to €496k in 2015.
- **Short-term bonus.** Josep Pique Camps had a short-term bonus in 2014 and 2015.
- **Long-term bonus.** Josep Pique Camps had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2016.** This long-term bonus comprised the years 2013 – 2016 and the CEO did not receive any compensation under this plan.
- **Share based compensation.** Josep Pique Camps had no share based compensation plans during the Observation Period.
- **Other concepts.** Josep Pique Camps received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.36 Red Electrica Corporacion, S.A.

Red Electrica Corporacion, S.A. (hereinafter, **REE**) is a Spanish company founded on the 29 January 1985<sup>82</sup>. REE is “*a global operator of strategic infrastructure, we manage electricity transmission grids, fibre optic networks and satellites and promote innovation in the fields of electricity and telecommunications*”<sup>83</sup>.

On the 8 March 2012, the Board of Directors of REE appointed Jose Folgado Blanco as CEO and President of the company. Jose Folgado Blanco was the CEO and President of the company between 8 March 2012 and 31 December 2015. After the 31 December 2015, Jose Folgado Blanco was the President of REE until the end of the Observation Period.

On the 28 July 2015, the Board of Directors of REE appointed Juan Francisco Lasala Bernad as CEO of the company. Juan Francisco Lasala Bernad was CEO of the company from 28 July 2015 until the end of the Observation Period.

The compensation of Jose Folgado Blanco as CEO and President of REE between 1 January 2013 and 31 December 2015 was formed by:

- **Fixed salary.** Jose Folgado Blanco had a fixed salary of €400k between 2013 and 2015.

---

<sup>82</sup> Informa Database (2021).

<sup>83</sup> REE’s webpage (<https://www.ree.es/en/about-us/business-activities>).

- **Short-term bonus.** Jose Folgado Blanco had a short-term bonus between 2013 and 2015. Regarding the short-term bonus:
  - The IARC table of 2013 includes part of the accrued long-term bonus as short-term bonus. Hence, I adjusted the short-term bonus compensation of this table to reflect the correct amount of short-term bonus received by the CEO.
  
- **Long-term bonus.** Jose Folgado Blanco had the following long-term bonus plans:
  - **Plan 2012-2013.** This long-term bonus comprised the years 2012 – 2013. This long-term bonus provided a compensation of €278k.
  - **Plan 2014-2019.** This long-term bonus comprised the years 2014 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
  
- **Share based compensation.** Jose Folgado Blanco had no share based compensation plans between 2013 and 2015.
  
- **Other concepts.** Jose Folgado Blanco received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Juan Francisco Lasala Bernad as CEO of REE in 2016 and 2017 was formed by:

- **Fixed salary.** Juan Francisco Lasala Bernad had a fixed salary of €352 in 2016 that increased to €399k in 2017.
- **Short-term bonus.** Juan Francisco Lasala Bernad had a short-term bonus in 2016 and 2017. Regarding the short-term bonus:
  - The IARC tables of 2016 and 2017 include part of the accrued long-term bonus as short-term bonus. Hence, I adjusted the short-term bonus compensation of these tables to reflect the correct amount of short-term bonus received by the CEO.
- **Long-term bonus.** Juan Francisco Lasala Bernad had the following long-term bonus plans:
  - **Plan 2014-2019.** This long-term bonus comprised the years 2014 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Share based compensation.** Part of the CEO's short-term bonus of 2016 and 2017 was paid in restricted shares. The CEO can only sell these shares after a 5-year holding period.

- **Other concepts.** Juan Francisco Lasala Bernad received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.37 Repsol, S.A.

Repsol, S.A. (hereinafter, **Repsol**) is a Spanish company founded on the 12 November 1986<sup>84</sup>. Repsol is a “*global multi-energy provider that strives to drive the evolution towards a low-emissions energy model*”<sup>85</sup>.

On the 27 October 2004, the Board of Directors of Repsol appointed Antonio Brufau Niubo as Executive President of the company. Antonio Brufau Niubo was the Executive President and developed the functions of the CEO from the beginning of the Observation Period until 30 April 2014, when Josu Jon Imaz San Miguel was appointed as CEO. Josu Jon Imaz San Miguel was the CEO from 30 April 2014 until the end of the Observation Period.

The compensation of Antonio Brufau Niubo in 2013 was formed by:

- **Fixed salary.** Antonio Brufau Niubo had a fixed salary of €2,368k in 2013.

---

<sup>84</sup> Informa Database (2021).

<sup>85</sup> Repsol’s webpage (<https://www.repsol.com/en/about-us/what-we-do/index.cshtml>).

- **Short-term bonus.** Antonio Brufau Niubo had a short-term bonus in 2013.

Regarding the short-term bonus:

- In 2013, the tables reported by Repsol discounted from the short-term bonus amount the compensation received by Antonio Brufau Niubo for participating in the boards of Repsol and its subsidiaries. I corrected this bias, which amounts to €619k in 2013, to determine the actual bonus earned by Antonio Brufau Niubo.

- **Long-term bonus.** Antonio Brufau Niubo had the following long-term bonus plans:

- **Plan 2010-2013.** This long-term bonus comprised the years 2010 – 2013. This long-term bonus provided a compensation of €1,360k.
- **Plan 2011-2014.** This long-term bonus comprised the years 2011 – 2014. This long-term bonus provided a compensation of €453k.

- **Share based compensation.** Antonio Brufau Niubo had no share based compensation plans in 2013 and 2014.

- **Other concepts.** Antonio Brufau Niubo received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

The compensation of Josu Jon Imaz San Miguel between 2015 and 2017 was formed by:

- **Fixed salary.** Josu Jon Imaz San Miguel had a fixed salary of €1,200k between 2015 and 2017.
- **Short-term bonus.** Josu Jon Imaz San Miguel had a short-term bonus between 2015 and 2017.
- **Long-term bonus.** Josu Jon Imaz San Miguel had the following long-term bonus plans:
  - **Plan 2012-2015.** This long-term bonus comprised the years 2012 – 2015. This long-term bonus provided a compensation of €242k.
  - **Plan 2013-2016.** This long-term bonus comprised the years 2013 – 2016. This long-term bonus provided a compensation of €328k.
  - **Plan 2014-2017.** This long-term bonus comprised the years 2014 – 2017. This long-term bonus provided a compensation of €983k.
  - **Plan 2015-2018.** This long-term bonus comprised the years 2015 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.

- **Plan 2016-2019.** This long-term bonus comprised the years 2016 – 2019. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Plan 2017-2020.** This long-term bonus comprised the years 2017 – 2020. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Share based compensation.** Josu Jon Imaz San Miguel had no share based compensation plans between 2015 and 2017.
- **Other concepts.** Josu Jon Imaz San Miguel additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.38 Sacyr, S.A.

Sacyr, S.A. (hereinafter, **Sacyr**) is a Spanish company founded on the 5 July 1921<sup>86</sup>. Sacyr “operates in more than twenty five countries” in the areas of “*engineering and infrastructures, concessions, services and industrial*”<sup>87</sup>.

On the 10 November 2004, the Board of Directors of Sacyr appointed Manuel Manrique Cecilia as CEO of the company. And in October 2011, the Board of Directors of Sacyr

---

<sup>86</sup> Informa Database (2021).

<sup>87</sup> Sacyr’s webpage ([http://www.sacyr.com/es\\_en/global-company/Corporate-activity/default.aspx](http://www.sacyr.com/es_en/global-company/Corporate-activity/default.aspx)).

appointed Manuel Manrique Cecilia as President of the company. Consequently, Manuel Manrique Cecilia was CEO and President of Sacyr during the Observation Period.

The compensation of Manuel Manrique Cecilia, CEO of Sacyr, was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,400k in 2013 that increased to €1,530k in 2017.
- **Short-term bonus.** The CEO had a short-term bonus between 2013 and 2017.
- **Long-term bonus.** The CEO had the following long-term bonus plan during the Observation Period:
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Share based compensation.** The CEO had no share based compensation plans during the Observation Period.
- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

### 7.1.39 Siemens Gamesa Renewable Energy, S.A.

Siemens Gamesa Renewable Energy, S.A. (hereinafter, **Siemens**) is a Spanish company founded on the 28 January 1976<sup>88</sup>. Siemens “*is a leading supplier of wind power solutions to customers all over the globe*”<sup>89</sup>.

On the 23 May 2012, the Board of Directors of Siemens appointed Ignacio Martin San Vicente as CEO and President of the company. Ignacio Martin San Vicente was CEO and President of Siemens between 1 January 2013 and 8 May 2017, when Markus Tacke was appointed as CEO. Markus Tacke was the CEO from 8 May 2017 until the end of the Observation Period.

Ignacio Martin San Vicente was the only CEO of Siemens that occupied the CEO position for a complete year during the Observation Period, in particular, for the years 2013 – 2016. The compensation of Ignacio Martin San Vicente in these years was formed by:

- **Fixed salary.** Ignacio Martin San Vicente had a fixed salary of €450k in 2013 that increased to €674k in 2016.
- **Short-term bonus.** Ignacio Martin San Vicente had short-term bonus between 2013 and 2016.

---

<sup>88</sup> Informa Database (2021).

<sup>89</sup> Siemen’s webpage (<https://www.siemensgamesa.com/en-int/about-us>).

- **Long-term bonus.** Ignacio Martin San Vicente had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015. This long-term bonus provided a compensation of €1,260k and 189,759 shares (valued at €3,002k based on the share price at the end of 2015).
  - **Plan 2016-2017.** This long-term bonus comprised the years 2016 – 2017. This long-term bonus provided a compensation of €943k.
  
- **Share based compensation.** Part of the long-term bonus corresponding to the plan 2013-2015 was paid in shares that were assigned in 2017. Hence, I consider the change in value of these shares during 2016 as an incentive from restricted shares.
  
- **Other concepts.** Ignacio Martin San Vicente received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.40 Tecnicas Reunidas, S.A.

Tecnicas Reunidas, S.A. (hereinafter, **Tecnicas**) is a Spanish company founded on the 6 July 1960<sup>90</sup>. Tecnicas is “*is a company specialized in the design and management of the execution of industrial plant projects throughout the world*”<sup>91</sup>.

On the 10 May 2006, the Board of Directors of Tecnicas appointed Jose Llado Fernandez-Urrutia as Director of the company. Jose Llado Fernandez-Urrutia was Executive President of Tecnicas during the Observation Period. This position is the closest one to the CEO position in Tecnicas’ organization chart.

The compensation of Jose Llado Fernandez-Urrutia, Executive President of Tecnicas, was formed by:

- **Fixed salary.** Jose Llado Fernandez-Urrutia had a fixed salary of €121k in 2013 that increased to €850k in 2017.
- **Short-term bonus.** Jose Llado Fernandez-Urrutia had short-term bonus between 2015 and 2017.
- **Long-term bonus.** Jose Llado Fernandez-Urrutia had no long-term bonus plans during the Observation Period.

---

<sup>90</sup> Informa Database (2021).

<sup>91</sup> Tecnicas’ webpage (<https://www.tecnicasreunidas.es/en/about-us/>).

- **Share based compensation.** Jose Llado Fernandez-Urrutia had no share based compensation plans during the Observation Period.
- **Other concepts.** Jose Llado Fernandez-Urrutia received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### 7.1.41 Telefonica, S.A.

Telefonica, S.A. (hereinafter, **Telefonica**) is a Spanish company founded on the 19 April 1924<sup>92</sup>. Telefonica is “*one of the world’s leading communications services providers*”<sup>93</sup>.

On the 17 September 2012, the Board of Directors of Telefonica appointed José María Álvarez-Pallete López as CEO of the company. José María Álvarez-Pallete López was CEO of Telefonica between 1 January 2013 and 25 July 2017, when Ángel Vilá Boix was appointed as CEO. Taking into account that José María Álvarez-Pallete López became the Executive President of Telefonica after 25 July 2017, I consider the compensation received by José María Álvarez-Pallete López during 2017 as the CEO compensation for this 2017.

---

<sup>92</sup> Informa Database (2020).

<sup>93</sup> Telefónica’s webpage (<https://www.telefonica.com/documents/153952/13347920/2019-Telefonica-Consolidated-Management-Report.pdf/0a9c8382-c9ff-ba52-1d5b-e431a7efab3f>).

The compensation of José María Álvarez-Pallete López during the Observation Period was formed by:

- **Fixed salary.** The CEO had a fixed salary of €1,923k during the Observation Period.
- **Short-term bonus.** The CEO had short-term bonus during the Observation Period.
- **Long-term bonus.** The CEO did not have any long-term bonus plans during the Observation Period:
- **Share based compensation.** The CEO had the following share based compensation plans during the Observation Period:
  - **Global Employee Share Plan 2012.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 100 restricted shares.
    - Restricted shares grant date: 1 May 2012.
    - Restricted shares grant price: €0.00.
    - Restricted shares vesting date: 1 May 2013.

- Vesting conditions: maintaining the personal investment in the company.
- **Global Employee Share Plan 2013.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 111 restricted shares.
    - Restricted shares grant date: 1 May 2013.
    - Restricted shares grant price: €0.00.
    - Restricted shares vesting date: 1 May 2014.
    - Vesting conditions: maintaining the personal investment in the company.
  - **Global Employee Share Plan 2015.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 63 restricted shares.
    - Restricted shares grant date: 1 May 2015.
    - Restricted shares grant price: €0.00.
    - Restricted shares vesting date: 1 May 2016.

- Vesting conditions: maintaining the personal investment in the company.
- **Global Employee Share Plan 2016.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 115 restricted shares.
    - Restricted shares grant date: 1 May 2016.
    - Restricted shares grant price: €0.00.
    - Restricted shares vesting date: 1 May 2017.
    - Vesting conditions: maintaining the personal investment in the company.
  - **Global Employee Share Plan 2017.** This is a restricted shares plan with the following characteristics:
    - Number of restricted shares: 178 restricted shares.
    - Restricted shares grant date: 1 May 2017.
    - Restricted shares grant price: €0.00.
    - Restricted shares vesting date: 1 May 2018.

- Vesting conditions: maintaining the personal investment in the company.
- **Plan 2010.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 77,680 restricted shares.
  - Restricted shares grant date: 1 July 2010.
  - Restricted shares grant price: €15.09.
  - Restricted shares vesting date: 1 July 2013.
  - Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are those that belonged to the FTSE Global Telecom Index. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
    - If Telefonica's percentile was worse than the median, no restricted share would consolidate.
    - If Telefonica's percentile was the median, 30% of restricted shares would consolidate.

- If Telefonica's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the FTSE Global Telecom Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested in 2013, generating a null payoff.

- **Plan 2011.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 124,249 restricted shares.
  - Restricted shares grant date: 1 July 2011.
  - Restricted shares grant price: €16.99.
  - Restricted shares vesting date: 1 July 2014.
  - Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are those that belonged to the DJ Global Sector Titans Telecom Index. The

consolidation of restricted share is as follows (linear interpolation is used for intermediate results):

- If Telefonica's percentile was worse than the median, no restricted share would consolidate.
- If Telefonica's percentile was the median, 30% of restricted shares would consolidate.
- If Telefonica's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the DJ Global Sector Titans Telecom Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested in 2014, generating a null payoff.

- **Plan 2012.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 293,955 restricted shares.
  - Restricted shares grant date: 1 July 2012.

- Restricted shares grant price: €10.37.
- Restricted shares vesting date: 1 July 2015.
- Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are those that belonged to the DJ Global Sector Titans Telecom Index. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
  - If Telefonica's percentile was worse than the median, no restricted share would consolidate.
  - If Telefonica's percentile was the median, 30% of restricted shares would consolidate.
  - If Telefonica's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the DJ Global Sector Titans Telecom Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested in 2015, generating a €1,254k payoff.

- **Plan 2013.** This is a restricted shares plan with the following characteristics:

- Number of restricted shares: maximum of 300,000 restricted shares.
- Restricted shares grant date: 1 July 2013.
- Restricted shares grant price: €10.00.
- Restricted shares vesting date: 1 July 2016.
- Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are those that belonged to the DJ Global Sector Titans Telecom Index. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
  - If Telefonica's percentile was worse than the median, no restricted share would consolidate.
  - If Telefonica's percentile was the median, 30% of restricted shares would consolidate.

- If Telefonica's percentile was equal or higher than the third upper quartile, 100% of restricted shares would consolidate.

Because the information regarding the member companies of the DJ Global Sector Titans Telecom Index is not public, I valued this plan as if it was a long-term bonus.

These restricted shares vested in 2016, generating a null payoff.

- **Plan 2014.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 300,000 restricted shares.
  - Restricted shares grant date: 1 July 2014.
  - Restricted shares grant price: €12.67.
  - Restricted shares vesting date: 1 July 2017.
  - Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are specified in the

IARCs of Telefonica. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):

- If Telefonica's percentile was worse than the median, no restricted share would consolidate.
- If Telefonica's percentile was the median, 30% of restricted shares would consolidate.
- If Telefonica's percentile was equal or higher than the third upper quartile and lower than the ninth decile, 100% of restricted shares would consolidate.
- If Telefonica's percentile was equal or higher than the ninth decile, 125% of restricted shares would consolidate.

I valued this restricted share plan applying the Monte Carlo approach, using the financial valuation model included in Appendix III.

These restricted shares vested in 2017, generating a null payoff.

- **Plan 2015.** This is a restricted shares plan with the following characteristics:
  - Number of restricted shares: maximum of 300,000 restricted shares.

- Restricted shares grant date: 1 July 2015.
- Restricted shares grant price: €12.94.
- Restricted shares vesting date: 1 July 2018.
- Vesting conditions: the number of consolidated restricted shares depends on the evolution of the group of comparable companies plus Telefonica. The comparable companies are specified in the IARCs of Telefonica. The consolidation of restricted share is as follows (linear interpolation is used for intermediate results):
  - If Telefonica's percentile was worse than the median, no restricted share would consolidate.
  - If Telefonica's percentile was the median, 30% of restricted shares would consolidate.
  - If Telefonica's percentile was equal or higher than the third upper quartile and lower than the ninth decile, 100% of restricted shares would consolidate.
  - If Telefonica's percentile was equal or higher than the ninth decile, 125% of restricted shares would consolidate.

I valued this restricted share plan applying the Monte Carlo approach, using the financial valuation model included in Appendix III.

These restricted shares did not vest yet at end of the Observation Period.

- **Other concepts.** The CEO received additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

#### **7.1.42 Viscofan, S.A.**

Viscofan, S.A. (hereinafter, **Viscofan**) is a Spanish company founded on the 17 October 1975<sup>94</sup>. Viscofan *“is the world leader in casings for meat products with distribution in more than 100 countries around the world”*<sup>95</sup>.

On the 22 May 2006, Jose Antonio Canales Garcia was appointed as the General Manager of Viscofan. The position developed by Jose Antonio Canales Garcia is the closest one to the CEO position in Viscofan’s organization chart.

Jose Antonio Canales Garcia was not a member of the Board of Directors until the 11 April 2014. Consequently, the IARCs of Viscofan do not include any information regarding Jose Antonio Canales Garcia before 2014.

---

<sup>94</sup> Informa Database (2021).

<sup>95</sup> Viscofan’s webpage (<https://www.viscofan.com/>).

The compensation of Jose Antonio Canales Garcia between 2014 and 2017 was formed by:

- **Fixed salary.** Jose Antonio Canales Garcia had a fixed salary of €307k in 2014 that increased to €347k in 2017.
- **Short-term bonus.** Jose Antonio Canales Garcia had short-term bonus between 2014 and 2017.
- **Long-term bonus.** Jose Antonio Canales Garcia had the following long-term bonus plans during the Observation Period:
  - **Plan 2013-2015.** This long-term bonus comprised the years 2013 – 2015. This long-term bonus provided a compensation of €139k.
  - **Plan 2016-2018.** This long-term bonus comprised the years 2016 – 2018. At the end of the Observation Period, this long-term bonus has not yet provided any compensation.
- **Share based compensation.** Jose Antonio Canales Garcia had no share based compensation plans during the Observation Period.
- **Other concepts.** Jose Antonio Canales Garcia did not receive any additional compensation for other concepts such as attendance fees, contributions to pension plans or insurance coverage.

## 7.2 Analysis of CEOs' compensation and incentives

The following figure summarizes the information regarding CEOs' compensation and incentives, expressed in euros:

**Figure 24. Estimated remuneration and private portfolio incentives between 2013 and 2017 (euros)**

Description	Mean	Std. Dev.	Min.	P10	P25	P50	P75	P90	Max
Salary	1,038,733	665,450	121,000	386,524	550,000	856,500	1,404,050	1,923,100	3,268,000
Fixed remuneration	78,168	113,769	-	-	-	55,000	92,000	194,500	567,000
Membership of Committees	19,847	47,493	-	-	-	-	-	92,500	177,000
Attendance fees	25,000	39,055	-	-	-	-	37,250	87,000	166,000
Saving schemes	419,772	754,785	-	-	-	31,500	400,250	1,481,500	3,850,000
Other items	73,504	215,683	-	-	-	15,500	47,750	140,000	1,676,000
Short-term bonus	1,142,082	1,136,934	-	179,760	299,880	662,034	1,641,250	2,983,500	5,881,663
Long-term bonus	352,053	964,501	-	-	-	-	250,250	945,500	8,250,000
Restricted shares granted	126,886	635,643	-	-	-	-	-	-	5,740,000
Options granted	25,845	188,105	-	-	-	-	-	-	1,715,310
<b>Estimated remuneration</b>	<b>3,301,890</b>	<b>2,627,709</b>	<b>165,871</b>	<b>703,500</b>	<b>1,215,805</b>	<b>2,508,500</b>	<b>4,921,500</b>	<b>6,517,500</b>	<b>12,170,000</b>
Annual change rest. shares	67,286	518,163	-730,112	-	-	-	-	108,979	6,520,558
Annual change options	102,571	733,311	-1,465,160	-	-	-	-	19,515	5,431,970
Annual change priv. shares	5,129,399	40,697,105	-230,812,100	-188,102	-535	12,803	390,948	3,553,353	343,316,286
<b>Annual change in portfolio</b>	<b>5,299,255</b>	<b>40,676,356</b>	<b>-230,812,100</b>	<b>-403,370</b>	<b>-248</b>	<b>17,418</b>	<b>715,865</b>	<b>4,079,178</b>	<b>343,384,356</b>
<b>Change in estimated wealth</b>	<b>8,601,145</b>	<b>41,142,510</b>	<b>-229,294,100</b>	<b>696,549</b>	<b>1,188,639</b>	<b>3,008,056</b>	<b>5,771,227</b>	<b>10,021,714</b>	<b>349,320,356</b>
Observations	176								

Source: own preparation based on compensation included in firms' IAGCs and IARCs

On average, CEOs received a salary of €1,038,733 on average, ranging from €121,000 to €3,268,000. This range is fairly wide, especially considering that sampled data come from the biggest Spanish companies (companies that were part of IBEX-35 Index between 2013 and 2017).

Regarding incentives, it is important to highlight the relevance of the short-term bonus in comparison to the long-term bonus and the change in value of restricted shares and stock options. Except for the top 10%, the amount received by CEOs as short-term bonus is much higher than the amount received as long-term bonus or as the increase in the value of restricted shares and stock options.

The following figure summarizes the information regarding CEOs' compensation and incentives expressed as percentage of estimated remuneration. For example, if the estimated remuneration is €1,000,000 and the annual change in the portfolio of restricted shares is €3,000,000, then the annual change in the portfolio of restricted shares would be 300% of the estimated remuneration.

**Figure 25. Estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration)**

Description	Mean	Std. Dev.	Min.	P10	P25	P50	P75	P90	Max
Salary	31%	25%	73%	55%	45%	34%	29%	30%	27%
Fixed remuneration	2%	4%	-	-	-	2%	2%	3%	5%
Membership of Committees	1%	2%	-	-	-	-	-	1%	1%
Attendance fees	1%	1%	-	-	-	-	1%	1%	1%
Saving schemes	13%	29%	-	-	-	1%	8%	23%	32%
Other items	2%	8%	-	-	-	1%	1%	2%	14%
Short-term bonus	35%	43%	-	26%	25%	26%	33%	46%	48%
Long-term bonus	11%	37%	-	-	-	-	5%	15%	68%
Restricted shares granted	4%	24%	-	-	-	-	-	-	47%
Options granted	1%	7%	-	-	-	-	-	-	14%
<b>Estimated remuneration</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Annual change portf. of rest. shares	2%	20%	-440%	-	-	-	-	2%	54%
Annual change portf. of options	3%	28%	-883%	-	-	-	-	0%	45%
Annual change portf. of priv. shares	155%	1,549%	-139,152%	-27%	-0%	1%	8%	55%	2,821%
<b>Annual change in portfolio</b>	<b>160%</b>	<b>1,548%</b>	<b>-139,152%</b>	<b>-57%</b>	<b>-0%</b>	<b>1%</b>	<b>15%</b>	<b>63%</b>	<b>2,822%</b>
<b>Change in estimated wealth</b>	<b>260%</b>	<b>1,566%</b>	<b>-138,236%</b>	<b>99%</b>	<b>98%</b>	<b>120%</b>	<b>117%</b>	<b>154%</b>	<b>2,870%</b>
Observations	176								

Source: own preparation based on compensation included in firms' IAGCs and IARCs

The previous figure shows:

- i. The relevance of short-term bonus as the main incentive of CEOs' compensation, since it on average represents 35% of total estimated remuneration.
- ii. The little use of restricted shares and stock options as a compensation incentive. I would like to highlight that, unlike short and long term bonus, the annual change

in the portfolio of restricted shares and options can be negative, penalizing the CEO for the bad performance of the firm (measured as change in the stock value).

- iii. The relevance of the annual change in the portfolio of private shares (shares that can be sold by the CEO at any time with no restriction). On average, this incentive represents 155% of CEOs' total estimated remuneration and, therefore, it is the strongest incentive overall.

The data in the previous figure differ from the data included in Gomez (2019) due to:

- i. **Considering the information included in the body of the IARCs.** While Gomez (2019) uses the information included in the IARCs' summary tables, the present research also considers the information included in the body of the IARCs. The information included in the body of the IARCs allows to identify the following inaccuracies in the summary tables:
  - a. **Misclassifications of compensation amounts.** For example, the 2014 IARC summary table of Abertis misclassifies part of the long-term bonus as contribution to a pension plan. Another example is the IARCs' summary tables of Bankinter for the period 2013-2017, which misclassify part of the short-term bonus as share-based compensation because it was paid in company's shares.



- iii. **Considering the annual change in the portfolio of private shares.** The present research extends the work started by Gomez (2019) by incorporating the incentive created by CEOs' private investment in shares of the companies they manage.

In conclusion, **CEO compensation design in Spanish firms is characterized by the relevance of the short-term bonus (which represent 35% of total estimated remuneration on average) and the little use of restricted shares and stock options.** Besides compensation incentives, **CEOs in Spanish firms have an additional incentive arising from their private investment in firm's shares, which on average represents 155% of CEOs' total estimated remuneration.**

### 7.3 Evolution of CEOs' compensation and incentives during the period under analysis

The following figure summarizes the evolution of CEOs' compensation and incentives between 2013 and 2017, expressed in euros:

**Figure 26. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (euros)**

Description	2013	2014	2015	2016	2017	2013-2017
Salary	1,011,700	1,003,790	1,012,174	1,028,081	1,144,387	<b>1,038,733</b>
Fixed remuneration	82,667	68,257	81,010	73,281	86,858	<b>78,168</b>
Membership of Committees	18,939	16,600	21,139	19,897	22,727	<b>19,847</b>
Attendance fees	33,242	29,114	22,611	19,923	21,000	<b>25,000</b>
Saving schemes	268,606	415,686	362,389	462,718	587,116	<b>419,772</b>
Other items	61,182	40,714	81,606	95,510	85,758	<b>73,504</b>
Short-term bonus	1,041,263	1,171,019	1,048,867	1,106,576	1,355,862	<b>1,142,082</b>
Long-term bonus	219,758	212,114	334,478	384,107	614,061	<b>352,053</b>
Restricted shares granted	175,893	108,189	147,948	161,482	33,847	<b>126,886</b>
Options granted	1,865	100,010	-	9,219	19,009	<b>25,845</b>
<b>Estimated remuneration</b>	<b>2,915,115</b>	<b>3,165,493</b>	<b>3,112,221</b>	<b>3,360,794</b>	<b>3,970,624</b>	<b>3,301,890</b>
Annual change in portf. of rest. shares	94,503	208,162	-23,969	8,736	59,399	<b>67,286</b>
Annual change in portf. of options	223,771	228,864	115,278	-65,914	32,678	<b>102,571</b>
Annual change in portf. of private shares	15,612,186	5,105,183	-311,664	7,288,236	-1,943,351	<b>5,129,399</b>
<b>Annual change in portfolio</b>	<b>15,930,461</b>	<b>5,542,209</b>	<b>-220,355</b>	<b>7,231,058</b>	<b>-1,851,274</b>	<b>5,299,255</b>
<b>Change in estimated wealth</b>	<b>18,845,576</b>	<b>8,707,702</b>	<b>2,891,866</b>	<b>10,591,852</b>	<b>2,119,350</b>	<b>8,601,145</b>
Observations	33	35	36	39	33	<b>176</b>

Source: own preparation based on compensation included in firms' IAGCs and IARCs

On average, between 2013 and 2017 CEOs' estimated remuneration increased 8.03% annually. This percentage of increase is higher than the Spanish annual inflation during the same period, which was 0.41%<sup>96</sup>. The increase in estimated remuneration was mainly due to the increase in bonus compensation. Altogether, the increase in CEOs

<sup>96</sup> This calculation is based on data obtained from the National Statistics Institute (www.ine.es). In particular, the General PCI in 2013 was 101.512 and raised to 103.184 in 2017.

compensation from short and long term bonus represents 67.16% of the total increase in the estimated remuneration between 2013 and 2017.

The impact of the annual change in the portfolio of restricted shares and stock options is relatively small due to the infrequent use of these incentives in Spanish firms. In contrast, there is a significant incentive arising from the private investment of CEOs in firms' shares. The increase in wealth provided by private shares is fairly volatile from year to year, ranging from a year average of -€1,943,351 to a year average of €15,612,186.

The following figure summarizes the evolution of CEOs' compensation and incentives between 2013 and 2017, expressed as percentage of estimated remuneration:

**Figure 27. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration)**

Description	2013	2014	2015	2016	2017	Total
Salary	35%	32%	33%	31%	29%	<b>31%</b>
Fixed remuneration	3%	2%	3%	2%	2%	<b>2%</b>
Membership of Committees	1%	1%	1%	1%	1%	<b>1%</b>
Attendance fees	1%	1%	1%	1%	1%	<b>1%</b>
Saving schemes	9%	13%	12%	14%	15%	<b>13%</b>
Other items	2%	1%	3%	3%	2%	<b>2%</b>
Short-term bonus	36%	37%	34%	33%	34%	<b>35%</b>
Long-term bonus	8%	7%	11%	11%	15%	<b>11%</b>
Restricted shares granted	6%	3%	5%	5%	1%	<b>4%</b>
Options granted	0%	3%	-	0%	0%	<b>1%</b>
<b>Estimated remuneration</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Annual change in portf. of rest. shares	3%	7%	-1%	0%	1%	<b>2%</b>
Annual change in portf. of options	8%	7%	4%	-2%	1%	<b>3%</b>
Annual change in portf. of private shares	536%	161%	-10%	217%	-49%	<b>155%</b>
<b>Annual change in portfolio</b>	<b>546%</b>	<b>175%</b>	<b>-7%</b>	<b>215%</b>	<b>-47%</b>	<b>160%</b>
<b>Change in estimated wealth</b>	<b>646%</b>	<b>275%</b>	<b>93%</b>	<b>315%</b>	<b>53%</b>	<b>260%</b>
Observations	33	35	36	39	33	<b>176</b>

Source: own preparation based on compensation included in firms' IAGCs and IARCs

The previous figure shows that:

- i. The short-term bonus is the most relevant compensation incentive throughout the Observation Period, representing on average 35% of estimated remuneration.
- ii. The long-term bonus is the second most relevant compensation incentive, increasing its relevance during the Observation Period from 11% of estimated remuneration in 2013 to 15% of estimated remuneration in 2017.
- iii. The relevance of restricted shares and stock options was relatively small in 2013 and it became smaller during the Observation Period.
- iv. The annual change in the portfolio of private shares (shares that can be sold by the CEO at any time with no restriction) is relatively high in each year of the Observation Period except in 2015. This is due to actual share performance in 2015, since the exposure of CEO to firm shares did not change significantly.

It is important to mention the high volatility of the annual change in the portfolio of private shares, which implies that the change in wealth arising from the portfolio of private shares varies significantly from year to year.

The following figure shows how often companies use each incentive during the Observation Period. The results are expressed as percentage of the number of observations. For example, 94% of the observations in 2013 had a short-term bonus plan.

Based on the results shown in the following figure, we can conclude that:

- i. Almost all CEOs (98% of total observations) had short-term bonus plans during the Observation Period.
- ii. A significant proportion of CEOs (80% of total observations) had long-term incentives (long-term bonus, stock options or restricted shares) during the Observation Period. In particular:
  - a. 65% of the observations had long-term bonus.
  - b. 14% of the observations has stock options.
  - c. 25% of the observations had restricted shares.
- iii. Almost all CEOs (95% of total observations) had a private investment in firm's shares (an investment they could liquidate at any time).

**Figure 28. Usage of remuneration incentives and private portfolio incentives between 2013 and 2017**

Description	2013	2014	2015	2016	2017	Total
<b>Short-term bonus</b>	<b>94%</b>	<b>97%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>98%</b>
Long-term bonus	48%	63%	64%	72%	79%	65%
Options	21%	17%	14%	13%	6%	14%
Restricted Shares	15%	26%	22%	26%	36%	25%
<b>Long-term incentives</b>	<b>73%</b>	<b>83%</b>	<b>78%</b>	<b>82%</b>	<b>85%</b>	<b>80%</b>
<b>Private portfolio</b>	<b>97%</b>	<b>97%</b>	<b>97%</b>	<b>90%</b>	<b>97%</b>	<b>95%</b>
Observations	33	35	36	39	33	176

*Source: own preparation based on compensation included in firms' IAGCs and IARCs*

In relation to the **evolution of CEOs' compensation and incentives during the Observation Period**, the evidence shows that:

- i. **CEOs' estimated remuneration increased 8.03% annually during the Observation Period. The growth in the estimated remuneration is 67,16% due to the increase in short and long term bonus.** The impact of the annual change in the portfolio of restricted shares and stock options is relatively small due to the infrequent use of these incentives in Spanish firms.
- ii. **The short-term bonus is the most relevant compensation incentive throughout the Observation Period** (representing on average 35% of estimated remuneration) followed by the long-term bonus (which represent on average 11% of estimated remuneration).
- iii. Almost all CEOs (**98% of total observations**) had **short-term bonus plans**, and a significant proportion of CEOs (**80% of total observations**) had **long-term incentives** (long-term bonus, stock options or restricted shares).
- iv. Almost all CEOs (**95% of total observations**) had a **private investment in firm's shares** (an investment they could liquidate at any time). It is important to mention the high volatility of the annual change in the portfolio of private shares, which implies that the change in wealth arising from the portfolio of private shares varies significantly from year to year.

## 7.4 Analysis of Short-Term Bonus

This Section analyses the most relevant compensation incentive in CEO compensation plans, which is the short-term bonus.

As per the content of IARCs, short-term bonus are frequently linked to CEO's fixed salary, establishing the target and maximum short-term bonus as percentage of fixed salary. The following figure summarizes the evolution of short-term bonus during the Observation Period:

**Figure 29. Short-term bonus compensation as percentage of salary**

Year	Mean	Std. Dev.	Min.	P10	P25	P50	P75	P90	Max
2013	98%	67%	32%	37%	52%	79%	110%	165%	304%
2014	112%	80%	0%	38%	65%	94%	159%	197%	365%
2015	103%	95%	0%	25%	58%	83%	141%	167%	563%
2016	131%	296%	0%	31%	57%	75%	114%	144%	1,937%
2017	114%	101%	14%	40%	65%	82%	132%	176%	588%
<b>Total</b>	<b>112%</b>	<b>160%</b>	<b>0%</b>	<b>33%</b>	<b>60%</b>	<b>84%</b>	<b>130%</b>	<b>178%</b>	<b>1,937%</b>
Observations	173								

*Source: own preparation based on compensation included in firms' IAGCs and IARCs*

The previous figure shows that:

- i. The short-term bonus represents on average an amount that is higher than CEOs' salary in each of the years of the Observation Period, except in 2013 where it was lower (representing 98% of CEOs' salary on average).
- ii. In 2013 and 2017, all short-term bonus provided a compensation for CEOs (the minimum short-term bonus was higher than zero in these years).

- iii. The short-term bonus may represent several times the amount of fixed salary compensation, which underlines the importance of the short-term bonus incentive.

In the analysis of the short-term bonus, following Holthausen et al. (1995), I classified the short-term bonus observations into the following categories:

- i. Above upper bound: which represents observations achieving at least 95% of the maximum short-term bonus.
- ii. Inside: which represents observations achieving a bonus amount higher than zero and lower than 95% of the maximum short-term bonus.
- iii. Below lower bound: which represents observations achieving no short-term amount (zero bonus).

**Figure 30. Classification of short-term bonus compensation**

<b>Description</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Total</b>
Above upper bound	29%	35%	14%	21%	21%	<b>24%</b>
Inside	71%	56%	78%	77%	79%	<b>72%</b>
Below lower bound (no bonus)	-	9%	8%	3%	-	<b>4%</b>
Observations	25	30	32	36	33	<b>156</b>

*Source: own preparation based on compensation included in firms' IAGCs and IARCs*

The previous figure shows that:

- i. Only 4% of the observations fall within the range “below lower bound”, which implies that short-term bonus schemes almost always provide some remuneration to CEOs.

- ii. 72% of the observations fall within the range “*inside*”, which implies that short-term bonus schemes fairly frequently provide a remuneration to CEOs that is below the maximum amount.
- iii. 24% of the observations fall within the range “*above upper bound*”, which implies that achieving the maximum short-term bonus amount is relatively difficult for CEOs.

The following figure shows the weight of each quantitative variable in the calculation of the short-term bonus. When capturing data, I grouped the different measures into the main categories shown in the table. For example, “income” groups all measures that are related to earnings (i.e., gross income or net income).

The data presented correspond to observations where the quantitative variables used to calculate the short-term bonus were specified in the IARCs. In cases where the variables were specified but not their weight, I assumed that each variable had the same equal weight (i.e., if there was 5 variables, I assumed each variable had a 20% weight).

**Figure 31. Variables used in the calculation of short-term bonuses**

Description	2013	2014	2015	2016	2017	Total
Income	51%	59%	55%	53%	52%	<b>54%</b>
Sales	11%	13%	11%	12%	11%	<b>12%</b>
Cash flow	6%	4%	6%	5%	5%	<b>5%</b>
Strategic plan	5%	3%	4%	4%	3%	<b>4%</b>
Debt	4%	3%	3%	3%	3%	<b>3%</b>
Expenses	4%	3%	3%	1%	2%	<b>3%</b>
Efficiency	1%	1%	2%	4%	4%	<b>3%</b>
Share price	2%	3%	2%	2%	2%	<b>2%</b>
Investment	3%	2%	2%	1%	1%	<b>2%</b>
Working Capital	-	2%	1%	2%	1%	<b>1%</b>
Other	12%	7%	11%	14%	16%	<b>12%</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Observations	23	27	30	35	30	145

*Source: own preparation based on compensation included in firms' IAGCs and IARCs*

The previous figure shows that income and sales are the most frequent quantitative variables used in the calculation of short-term bonuses. On average, income had a 54% and sales a 12% weight in the calculation of short-term bonuses. The rest of the quantitative variables are used much less than income and sales in the calculation of short-term bonuses.

Based on the review of IARCs, the objectives established to receive the short-term bonus are only related to firm's performance, that is to say, they are not related to the relative performance against competitors. In this way, the short-term bonus only depends on the performance of the firm, regardless of the performance of its competitors.

In relation to the **analysis of short-term bonus (the most relevant CEOs' compensation incentive)**, the evidence shows that:

- i. **The short-term bonus represents on average an amount that is higher than CEOs' salary** in each of the years of the Observation Period, except in 2013 where it was lower (representing 98% of CEOs' salary on average).
- ii. **Short-term bonuses almost always provide some remuneration to CEOs** (only 4% of the observations did not provide any short-term bonus amount). **However, it is relatively difficult for CEOs to achieve the maximum short-term bonus amount** (only 24% of the observations provided the maximum amount).
- iii. **Income and sales are the most frequent quantitative variables used in the calculation of short-term bonuses.** On average, income had a 54% and sales a 12% weight in the calculation of short-term bonuses. The rest of the quantitative variables are used much less than income and sales in the calculation of short-term bonuses.

## **7.5 International Comparison of CEO Compensation**

The following figure compares the compensation structure of CEOs in Spain with the compensation structure of CEOs in other countries.

**Figure 32. Estimated CEO remuneration structure in different countries**

Country	No. Observations	Mean Salary (Euro)	Median Salary (Euro)	Salary (%)	Bonus (%)	Options & Restr. Shares (%)	Other (%)
Norway	227	1,159,338	327,639	77%	10%	7%	7%
Sweden	659	1,444,972	562,867	65%	13%	2%	20%
Italy	488	2,831,137	1,629,794	57%	14%	9%	20%
Switzerland	210	4,082,886	1,991,037	51%	14%	24%	10%
Ireland	406	2,293,473	966,115	47%	15%	27%	11%
United Kingdom	3957	1,923,829	1,075,328	48%	17%	26%	9%
France	1455	2,117,052	739,288	63%	18%	16%	3%
Netherlands	583	1,587,789	982,917	49%	19%	19%	13%
Belgium	218	1,444,972	730,887	60%	20%	10%	11%
Germany	582	2,612,711	1,621,393	42%	40%	10%	8%
<b>European average</b>	<b>N/A</b>	<b>2,149,816</b>	<b>1,062,727</b>	<b>56%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>
<b>United States</b>	<b>13361</b>	<b>4,116,490</b>	<b>2,352,280</b>	<b>30%</b>	<b>22%</b>	<b>42%</b>	<b>6%</b>
<b>Spain</b>	<b>176</b>	<b>1,038,733</b>	<b>856,500</b>	<b>31%</b>	<b>45%</b>	<b>5%</b>	<b>19%</b>

Source: own preparation based on compensation included in firms' IAGCs and IARCs and Edmans et al. (2017)

The previous figure shows that:

- i. Salary compensation of CEOs in Spanish firms is fairly low on average in comparison with salary compensation of CEOs in other countries. There are some countries (i.e., France, Germany or Ireland) where the average CEO salary is more than twice the average salary received by CEOs in Spanish firms.
- ii. Bonus compensation of CEOs have the maximum relevance in Spanish firms, where on average it represents 45% of total CEO estimated remuneration, while it represents below 22% in other countries except in Germany where it reaches 40%.
- iii. Stock options and restricted shares compensation is fairly low in Spanish firms, where on average they only represent 5% of total CEO estimated remuneration,

while in other countries they represent a higher percentage except in the case of Sweden.

## 7.6 Relation between CEO Shareholdings and CEO Compensation Components

This Section analyzes the relation between CEO shareholdings and CEO compensation components.

This analysis was developed using the regression between CEO shareholdings at the end of the previous year (measured as percentage of estimated remuneration) and CEO compensation components (measured as percentage of estimated remuneration). The results are presented in the following figure:

**Figure 33. Regression between CEO shareholdings (as percentage of estimated remuneration) and CEO compensation components (as percentage of total estimated compensation)**

Independent variable	Dependent variable					
	Salary (%)	Other (%)	Short-term Bonus (%)	Long-term Bonus (%)	R. Shares granted (%)	Options granted (%)
Shareholding <sub>t-1</sub> (% of Est. Rem.)	6.18e-05** (1.997)	2.14e-06 (0.361)	-8.05e-05*** (-3.078)	-2.35e-05 (-0.985)	-6.39e-06 (-0.398)	-5.13e-07 (-0.109)
Constant	0.404*** (27.91)	0.0191*** (6.906)	0.327*** (26.77)	0.0773*** (6.926)	0.0211*** (2.806)	0.00412* (1.869)
Sample size	176	176	176	176	176	176
R <sup>2</sup>	0.022	0.001	0.052	0.006	0.001	0.000
F	3.986	0.131	9.475	0.970	0.159	0.0118

t-statistics in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: own preparation based on compensation included in firms' IAGCs and IARCs

Based on the results presented in the previous figure, the conclusions are that:

- i. There is a positive relationship between CEO shareholdings (measured as percentage of estimated remuneration) and the following CEO compensation components: salary and other compensation (measured as percentage of estimated remuneration). This positive relationship corresponds to fixed compensation components and it is due to the decrease of compensation incentives (short-term bonus, long-term bonus, grant of restricted shares and grant of stock options).
- ii. There is a negative relationship between CEO shareholdings (measured as percentage of estimated remuneration) and CEO compensation incentives (measured as percentage of estimated remuneration). This implies that the larger CEO's personal investments in firm shares, the lesser the compensation incentives (short-term and long-term bonus, restricted shares and stock options) that are granted to the CEO.

## **7.7 Relation between CEO Shareholdings and CEO/Firm Characteristics**

This Section presents the results of the analysis of the relation between CEO shareholdings and CEO/Firm characteristics.

In this analysis, I regressed CEO shareholdings (both in euros and as percentage of total equity) and CEO/firm characteristics. The CEO/firm characteristics that were considered in the analysis were limited by the availability of information. In this regard, I gather information and considered the following CEO/firm characteristics:

- i. CEO age.
- ii. CEO tenure.
- iii. Restricted shares granted (euros) as part of CEO compensation.
- iv. Options granted (euros) as part of CEO compensation.
- v. Firm size, measured as the natural logarithm of firm's total assets.
- vi. Duality, which corresponds to a dummy variable that is one when the CEO occupies both the positions of CEO and President of the Board of Directors.
- vii. Founder, which corresponds to a dummy variable that is one when the CEO is the founder or a member of the founding family.

The regression results are presented in the following figure:

**Figure 34. Regression between CEO shareholding and CEO/Firm characteristics**

Independent variable	Dependent variable	
	Shareholding (Euros)	Shareholding (%)
CEO age	9.721e+06*** (6.672)	0.00515*** (10.33)
CEO Tenure		-0.00459*** (-7.192)
Restricted shares granted		
Options granted	125.0** (2.203)	
ln(firm total assets)		-0.00477** (-2.440)
Firm age		
Duality		0.0159** (1.977)
Founder	3.606e+08*** (10.03)	0.117*** (10.15)
Constant	-5.288e+08*** (-6.584)	-0.144*** (-2.819)
Sample size	176	176
R <sup>2</sup>	0.580	0.648
F	79.33	62.69
p-value	0.0000	0.0000
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Source: own preparation based on compensation included in firms' IAGCs and IARCs

The results of the regression show that:

- i. CEO age is positively related to CEO shareholdings (both in terms of euros and percentage of total equity). This could be due to the CEO having higher wealth as the CEO gets older.
- ii. CEO tenure is negatively related to CEO shareholdings measured as percentage of total equity. This could be due to big companies (where CEOs usually have a

smaller percentage of total equity because of firm size) changing their CEO less frequently than small companies.

- iii. There is not enough evidence to support a relation between restricted share grants and CEO shareholdings (both in terms of euros and percentage of total equity).
- iv. There is not enough evidence to support a relation between stock option grants and CEO shareholdings measured as percentage of total equity. However, there is a positive relationship between stock options grants and CEO shareholdings measured in euros.
- v. Firm size is negatively related to CEO shareholdings measured as percentage of total equity, but not measured in euros. This could be due to CEOs maintaining the same euro investment in the company, but holding a smaller percentage as the company becomes bigger.
- vi. There is not enough evidence to support a relation between firm age and CEO shareholdings (both in terms of euros and percentage of total equity).
- vii. There is not enough evidence to support a relation between duality and CEO shareholdings measured in euros. However, there is a positive relationship between duality and CEO shareholdings measured as percentage of total equity.
- viii. There is a positive relationship between the CEO being the founder or a member of the founding family and CEO shareholdings (both in terms of euros and as

percentage of total equity). This result is reasonable because the founder (or founding family) of a company usually hold a significant equity investment in the company.

In conclusion, there is evidence supporting a positive relation between CEO shareholdings (measures in euros) and CEO age, stock options grants and the CEO being the founder or a member of the founding family. CEOs have greater shareholdings (measured in euros) as the CEO gets older, as the CEO receives stock option grants and as the CEO belongs to the founding family.

There is also evidence supporting a positive relation between CEO shareholdings (measured as percentage of total equity) and CEO age, duality and the CEO being the founder or a member of the founding family. CEOs have greater shareholdings (measured as percentage of total equity) as the CEO gets older, as the CEO simultaneously occupies the CEO and the President position, and as the CEO belongs to the founding family. In addition, CEO shareholding (measured as percentage of total equity) decreases with CEO tenure and firm size.



## **8 Results & Discussion regarding the Relation between CEO Incentives and Firm Performance**

This Section presents the results of the relation between CEO incentives and firm performance. These results exclude observations where the CEO is the founder or a member of the founding family because these observations are outliers in term of the private investment of the CEO in company's shares (these outliers have a much higher private investment in company's shares than the rest of the observations). I highlight that the results presented herein only refer to the relation between variables without cause-effect implications due to the lack of a valid identification instrument.

In the sampled data, only a small percentage of CEOs received incentives from restricted shares and stock options. However, almost all CEOs received incentives from their private investment in company's shares (private portfolio).

The following table shows the euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. On average, the incentive arising from the private portfolio (0.27 euros) is higher than the incentive provided by restricted shares (0.07 euros) and stock options (0.15 euros).

**Figure 35. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	0.07	0.44	-	-	-	-	-	0.01	0.05	1.04	5.23
Stock Options	0.15	0.90	-	-	-	-	-	-	0.13	4.36	8.10
Shares Priv. Portfolio	0.27	0.40	-	-	0.00	0.01	0.07	0.38	0.94	1.49	1.74
Observations	155										

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the euro amount increase in CEO incentives for each one thousand euro increase in shareholder value calculated for each year of the Observation Period. The incentive provided by restricted shares significantly decreased between 2013 and 2015, and then it went up again from 2015 to 2017. The incentive provided by stock options decreased during the Observation Period from 0.31 euros to 0.02 euros, while the incentive provided by the private portfolio remained fairly steady.

**Figure 36. Euro amount increase in CEO incentives for each one thousand euro increase in shareholder value. Yearly data**

Description	2013	2014	2015	2016	2017	2013-2017
Restricted Shares	0.05	0.18	0.01	0.03	0.07	0.07
Stock Options	0.31	0.30	0.08	0.07	0.02	0.15
Shares Private Portfolio	0.27	0.29	0.24	0.24	0.32	0.27
Observations	29	31	32	34	29	155

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the euro amount increase in CEO incentives when company's return changes from the median to percentile 75th. As stated previously, only a small percentage of CEOs received incentives as restricted shares and stock options. That is the reason why a significant proportion of observations has no pay-performance sensitivity of restricted shares and stock options.

On the other hand, there is a considerable incentive arising from the private investment of CEOs in company's shares. This incentive is present in a significant proportion of all the observations and it reaches a maximum of 8.86 million of euros when company's return changes from the median to percentile 75th.

**Figure 37. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	92,081	291,525	-	-	-	-	-	14,841	269,780	1,579,124	1,732,030
Stock Options	102,558	474,480	-	-	-	-	-	-	83,928	2,527,798	3,998,603
Shares Priv. Portfolio	641,837	1,618,257	-	-	135	12,122	95,050	337,801	1,236,748	8,091,447	8,857,451
Observations	155										

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the euro amount increase in CEO incentives when company's return changes from the median to percentile 75th for each year of the Observation period. Despite the incentive provided by restricted shares and stock options is relevant on average, the incentive arising from the private investment in company's shares is much higher.

**Figure 38. Euro amount increase in CEO incentives when firm return changes from percentile 50th to percentile 75th. Yearly data**

Description	2013	2014	2015	2016	2017	2013-2017
Restricted Shares	51,611	125,805	83,991	76,085	124,184	92,081
Stock Options	89,288	147,936	114,544	136,829	13,915	102,558
Shares Private Portfolio	402,618	566,002	591,258	701,085	948,467	641,837
Observations	29	31	32	34	29	155

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation

The following table shows the percentage increase in CEO incentives (over total estimated compensation) when company's return changes from percentile 50th to

percentile 75th. This measure is called the elasticity of incentives to changes in shareholder value (Hall & Liebman, 1998).

The average elasticity is 4% for restricted shares and 5% for stock options, which sums up to 9% elasticity corresponding to compensation components. This means that for each percentage increase in firm value, the CEO receive compensation incentives (increase in the value of restricted shares and options) that represent 9% over CEO's estimated remuneration.

Besides compensation incentives, CEOs also have incentives arising from their private investment in company's shares. The elasticity of this private incentive is 14% on average, which implies that this incentive is more relevant than the incentive arising from restricted shares and stock options altogether.

**Figure 39. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Aggregated data**

Description	Mean	Std. Dev.	Min.	P1	P10	P25	P50	P75	P90	P99	Max
Restricted Shares	0.04	0.29	-	-	-	-	-	0.00	0.04	0.22	3.65
Stock Options	0.05	0.43	-	-	-	-	-	-	0.03	0.60	5.29
Shares Priv. Portfolio	0.14	0.27	-	-	0.00	0.01	0.03	0.12	0.44	1.28	1.36
Observations	155										

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

The following table shows the percentage increase in CEO incentives (over total estimated compensation) when company's return changes from percentile 50th to percentile 75th for each year of the Observation period. The peak in 2014 in the elasticity of restricted shares and stock options is due to the compensation plan of the CEO of

Jazztel. If we exclude this data, the elasticity of restricted shares and stock options in 2014 would be similar to the other years.

The elasticity of the incentive of private portfolio has increased during the Observation Period. Except in 2014, the elasticity of the private portfolio was much higher than the elasticity of restricted shares and stock options, which highlights again the relevance of the incentive arising from CEO's private investment in company's shares.

**Figure 40. Percentage increase in CEO incentives (over total estimated compensation) when firm return changes from percentile 50th to percentile 75th. Yearly data**

Description	2013	2014	2015	2016	2017	2013-2017
Restricted Shares	0.01	0.13	0.01	0.01	0.02	0.04
Stock Options	0.02	0.19	0.03	0.03	0.00	0.05
Shares Private Portfolio	0.08	0.14	0.14	0.16	0.21	0.14
Observations	29	31	32	34	29	155

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

In conclusion, I found evidence of a weak relationship between CEO incentives and firm performance (this result refers to companies where the CEO is not a member of the founding family). On average, CEOs receive 0.49 euros for each one thousand euro increase in shareholder value. This result is lower than the 3.25 dollars obtained by Jensen & Murphy (1990), lower than the 25.11 dollars obtained by Hall & Liebman (1998) and higher than the 0.14 euros obtained by Gomez (2019). Most of the relationship between CEO incentives and firm performance corresponds to the private portfolio incentive, which highlights the importance of this incentive when studying executive compensation in Spanish firms.



## **9 Results & Discussion regarding the Employee Stock Option Valuation Model (ESOVM)**

The Employee Stock Option Valuation Model (ESOVM) represents an innovative approach to value employee stock options.

In the literature so far, employee stock options have been value using the Black-Scholes-Merton formula and applying inaccurate proxies to consider that these options tend to be exercised early. In particular, the literature has frequently assumed that employee stock options were either exercised:

- i. At the first date of the exercise period. This assumption results in a lower value than the actual value of the options because it completely omits all the time value of the options after the first date of the exercise period.
- ii. At the end of the exercise period. This assumption results in a higher value than the actual value of the options because it considers all the time value of the options while employees sacrifice part of this time value because of the early exercise.

In addition, the Black-Scholes-Merton formula is designed to value European options, which can only be exercised at the option maturity date. Consequently, the Black-Scholes-Merton only provides an approximation to the value of options that can be exercised in several dates (which are called Bermudan options), as it is frequently the case of employee stock options.

The Employee Stock Option Valuation Model implements the Monte Carlo methodology, which is the optimal methodology to value options that can be exercised in several dates, and incorporates the early exercise character of employee stock options. The detailed description of the methodology used to design, program and verify the Employee Stock Option Valuation Model is included in Section 6.3, while the Matlab code of this financial model is included in Appendix II.

To evaluate the results of the Employee Stock Option Valuation Model, I will compare the results of this model with the results of the Black-Scholes-Merton formula under the proxies that are common in the literature (employee stock options being exercised at the first date or at the end date of the exercise period). In particular, I will compare the results of the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula in the following cases:

- i. The valuation as of 31 December 2014 of the stock options corresponding to Plan 2011 of the CEO of Acciona.

These options were granted in 2012, their underlying is 4,874 shares of Acciona, they are exercisable from April 2014 until March 2017 and they have a strike price of 53.00 euros per share. Regarding the valuation parameters, I considered a (not-adjusted) stock price of 56.20 euros, a risk-free rate of 0.19%, a volatility of 40.04% and a dividend yield of 1.25%, based on the information obtained from Bloomberg.

- ii. The valuation as of present date of employee stock options that would be granted with characteristics that are common in the US, where these options are usually granted for longer periods.

Based on the information published by the Center on Executive Compensation<sup>97</sup>, employee stock options are usually granted for a period of 10 year, their strike price usually corresponds to “*the price of the company's stock on the date the options are granted*” (they are usually granted at the money) and they can be exercised after a holding period of time “*usually between one and five years*” (in the calculation, I considered that this period lasts five years). Regarding the valuation parameters, I assumed a package of 10,000 options, a (not-adjusted) stock price of 50 euros, a strike price of 50 euros, a risk-free rate of 0.50%, a volatility of 30.00% and a null dividend yield.

In the following figure I present the results corresponding to the case of the Spanish stock options described above. In particular, this table compares the results provided by the Employee Stock Option Valuation Model with the results provided by the Black-Scholes-Merton formula. In addition, I calculated the percentage of deviation of the Black-Scholes-Merton formula results over the Employee Stock Option Valuation Model results. As we can see in the figure, the Employee Stock Option Valuation Model is much

---

<sup>97</sup> <https://execcomp.org/Basics/Basic/Equity-Compensation>

more accurate than the Black-Scholes-Merton formula in determining the value of the options.

While the Employee Stock Option Valuation Model provides a value of 61,180 euros for the options at consideration, the Black-Scholes-Merton formula provides a value of 15,597 euros (under the assumption that the options will be exercised on the first date of the exercise period) and 66,004 euros (under the assumption that the options will be exercised on the end date of the exercise period). This example shows that the Black-Scholes-Merton formula may miss-price employee stock options by as much as 75% of the value calculated with the Employee Stock Option Valuation Model.

**Figure 41. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula for the case of Spanish stock options**

Model	Approximation for the exercise date	Valuation (Euros)	Deviation (% over ESOVM)
Employee Stock Option Valuation Model	N/A	61,180	-
Black-Scholes-Merton	First date of the exercise period	15,597	-74.5%
Black-Scholes-Merton	End date of the exercise period	66,004	7.9%

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

In the following figure I present the results corresponding to the case of the US stock options described above. As in the previous case, this table compares the results provided by the Employee Stock Option Valuation Model with the results provided by the Black-Scholes-Merton formula. In addition, I calculated the percentage of deviation of the Black-Scholes-Merton formula results over the Employee Stock Option Valuation Model results. As we can see in this example, the Employee Stock Option Valuation Model provides again a more accurate value of employee stock options than the Black-Scholes-Merton formula.

While the Employee Stock Option Valuation Model provides a value of 172,741 euros for the options at consideration, the Black-Scholes-Merton formula provides a value of 135,980 euros (under the assumption that the options will be exercised on the first date of the exercise period) and 190,346 euros (under the assumption that the options will be exercised on the end date of the exercise period). The difference in these valuations implies that the Black-Scholes-Merton formula may miss-price these options by as much as 21% of the value calculated by the Employee Stock Option Valuation Model.

**Figure 42. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula for the case of US stock options**

Model	Approximation for the exercise date	Valuation (Euros)	Deviation (% over ESOVM)
Employee Stock Option Valuation Model	N/A	172,741	-
Black-Scholes-Merton	First date of the exercise period	135,980	-21.3%
Black-Scholes-Merton	End date of the exercise period	190,346	10.2%

*Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation*

Despite the Employee Stock Option Valuation Model has a significant impact on the valuation of employee stock options, it has a very limited impact on the pay-performance sensitivity measures presented in Section 8. This is due to how the pay-performance sensitivity measures are calculated and to the little used of stock options in Spanish firms. Ultimately, these measures depend on annual changes in the value of stock options, instead that on the absolute value of these options. Consequently, despite there is a high difference between the values of stock options provided by the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula, there is a smaller difference when calculating changes in the value of the options with both models. In addition, there number of observations with stock options during the Observation Period is relatively

low, which also further reduces the impact of the Employee Stock Option Valuation Model on the pay-performance sensitivity measures calculated in Section 8.

In conclusion, the Employee Stock Option Valuation Model (ESOVVM) represents an innovative approach to value employee stock options. In the literature so far, employee stock options have been valued using the Black-Scholes-Merton formula and applying inaccurate proxies to consider that these options tend to be exercised early. The Employee Stock Option Valuation Model incorporates the early exercise character of employee stock options into the calculations. Consequently, the Employee Stock Option Valuation Model is much more accurate than the Black-Scholes-Merton formula in determining the value of employee stock options (the deviation between both models may reach 75% of option value).

## 10 Conclusions

### 10.1 Conclusions (English Version)

The conclusions reached in the analysis developed throughout this Doctoral Dissertation are set out as follows:

- i. CEO compensation design in Spanish firms is characterized by the **relevance of the short-term bonus** (which represent 35% of total estimated remuneration on average) and the **little use of restricted shares and stock options**. Besides compensation incentives, **CEOs in Spanish firms have an additional incentive arising from their private investment in firm shares**, which on average represents 155% of CEOs' total estimated remuneration.
- ii. Regarding the evolution of CEOs' compensation and incentives during the Observation Period, the evidence shows that:
  - a. **CEOs' estimated remuneration increased 8.03% annually during the Observation Period**. The growth in the estimated remuneration is 67,16% due to the increase in short and long term bonus. The impact of the annual change in the portfolio of restricted shares and stock options is relatively small due to the infrequent use of these incentives in Spanish firms.

- b. **The short-term bonus is the most relevant compensation incentive throughout the Observation Period** (representing on average 35% of estimated remuneration) followed by the long-term bonus (which represent on average 11% of estimated remuneration).
- c. **Almost all CEOs (98% of total observations) had short-term bonus plans**, and a significant proportion of CEOs (**80% of total observations) had long-term incentives** (long-term bonus, stock options or restricted shares).
- d. Almost all CEOs (**95% of total observations) had a private investment in firm's shares** (an investment they could liquidate at any time). It is important to mention the high volatility of the annual change in the portfolio of private shares, which implies that the change in wealth arising from the portfolio of private shares varies significantly from year to year.

**Figure 43. Mean estimated remuneration and private portfolio incentives between 2013 and 2017 (as percentage over estimated remuneration)**

Description	2013	2014	2015	2016	2017	Total
Salary	35%	32%	33%	31%	29%	31%
Fixed remuneration	3%	2%	3%	2%	2%	2%
Membership of Committees	1%	1%	1%	1%	1%	1%
Attendance fees	1%	1%	1%	1%	1%	1%
Saving schemes	9%	13%	12%	14%	15%	13%
Other items	2%	1%	3%	3%	2%	2%
Short-term bonus	36%	37%	34%	33%	34%	35%
Long-term bonus	8%	7%	11%	11%	15%	11%
Restricted shares granted	6%	3%	5%	5%	1%	4%
Options granted	0%	3%	-	0%	0%	1%
<b>Estimated remuneration</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Annual change in portf. of rest. shares	3%	7%	-1%	0%	1%	2%
Annual change in portf. of options	8%	7%	4%	-2%	1%	3%
Annual change in portf. of private shares	536%	161%	-10%	217%	-49%	155%
<b>Annual change in portfolio</b>	<b>546%</b>	<b>175%</b>	<b>-7%</b>	<b>215%</b>	<b>-47%</b>	<b>160%</b>
<b>Change in estimated wealth</b>	<b>646%</b>	<b>275%</b>	<b>93%</b>	<b>315%</b>	<b>53%</b>	<b>260%</b>
Observations	33	35	36	39	33	176

Source: own preparation based on compensation included in firms' IAGCs and IARCs

- iii. Regarding the analysis of short-term bonus (the most relevant CEOs' compensation incentive), the evidence shows that:
- a. **The short-term bonus represents on average an amount that is higher than CEOs' salary** in each of the years of the Observation Period, except in 2013 where it was lower (representing 98% of CEOs' salary on average).
  - b. **Short-term bonuses almost always provide some remuneration to CEOs** (only 4% of the observations did not provide any short-term bonus amount). **However, it is relatively difficult for CEOs to achieve the maximum short-term bonus amount** (only 24% of the observations provided the maximum amount).
  - c. **Income and sales are the most frequent quantitative variables used in the calculation of short-term bonuses.** On average, income had a 54% and sales a 12% weight in the calculation of short-term bonuses. The rest of the quantitative variables are used much less than income and sales in the calculation of short-term bonuses.

- iv. Regarding the comparison of the remuneration of CEOs in Spain with the remuneration of CEOs in other countries:
- a. **Salary compensation of CEOs in Spanish firms is fairly low on average in comparison with salary compensation of CEOs in other countries.** There are some countries (i.e., France, Germany or Ireland) where the average CEO's salary is more than twice the average salary received by CEOs in Spanish firms.
  - b. **Bonus compensation of CEOs have the maximum relevance in Spanish firms,** where on average it represents 45% of total CEO estimated remuneration, while it represents below 22% in other countries except in Germany where it reaches 40%.
  - c. **Stock options and restricted shares compensation is fairly low in Spanish firms,** where on average they only represent 5% of total CEO estimated remuneration, while in other countries they represent a higher percentage except in the case of Sweden.

**Figure 44. Estimated CEO remuneration structure in different countries**

Country	No. Observations	Mean Salary (Euro)	Median Salary (Euro)	Salary (%)	Bonus (%)	Options & Restr. Shares (%)	Other (%)
Norway	227	1,159,338	327,639	77%	10%	7%	7%
Sweden	659	1,444,972	562,867	65%	13%	2%	20%
Italy	488	2,831,137	1,629,794	57%	14%	9%	20%
Switzerland	210	4,082,886	1,991,037	51%	14%	24%	10%
Ireland	406	2,293,473	966,115	47%	15%	27%	11%
United Kingdom	3957	1,923,829	1,075,328	48%	17%	26%	9%
France	1455	2,117,052	739,288	63%	18%	16%	3%
Netherlands	583	1,587,789	982,917	49%	19%	19%	13%
Belgium	218	1,444,972	730,887	60%	20%	10%	11%
Germany	582	2,612,711	1,621,393	42%	40%	10%	8%
<b>European average</b>	<b>N/A</b>	<b>2,149,816</b>	<b>1,062,727</b>	<b>56%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>
<b>United States</b>	<b>13361</b>	<b>4,116,490</b>	<b>2,352,280</b>	<b>30%</b>	<b>22%</b>	<b>42%</b>	<b>6%</b>
<b>Spain</b>	<b>176</b>	<b>1,038,733</b>	<b>856,500</b>	<b>31%</b>	<b>45%</b>	<b>5%</b>	<b>19%</b>

Source: own preparation based on compensation included in firms' IAGCs and IARCs and Edmans et al. (2017)

- v. Regarding the relation between CEO shareholdings and CEO compensation components:
- a. There is a positive relationship between CEO shareholdings (measured as percentage of estimated remuneration) and the following CEO compensation components: salary and other compensation (measured as percentage of estimated remuneration).
  - b. There is a negative relationship between CEO shareholdings (measured as percentage of estimated remuneration) and CEO compensation incentives (measured as percentage of estimated remuneration). This implies that **the larger CEO's personal investments in firm shares, the lesser the compensation incentives (short-term and long-term bonus, restricted shares and stock options) that are granted to the CEO.**

- vi. Regarding the relation between CEO shareholdings and CEO/firm characteristics:
- a. There is evidence supporting a positive relation between CEO shareholdings (measures in euros) and CEO age, stock options grants and the CEO being the founder or a member of the founding family. **CEOs have greater shareholdings (measured in euros) as the CEO gets older, as the CEO receives stock option grants and as the CEO belongs to the founding family.**
  - b. There is also evidence supporting a positive relation between CEO shareholdings (measured as percentage of total equity) and CEO age, duality and the CEO being the founder or a member of the founding family. **CEOs have greater shareholdings (measured as percentage of total equity) as the CEO gets older, as the CEO simultaneously occupies the CEO and the President position, and as the CEO belongs to the founding family.** In addition, **CEO shareholding (measured as percentage of total equity) decreases with CEO tenure and firm size.**
- vii. **Regarding the analysis of the relation between CEO incentives and firm performance, this research found evidence of a weak relationship between CEO incentives and firm performance (this result refers to companies where the CEO is not a member of the founding family). On average, CEOs receive 0.49 euros for each one thousand euro increase in shareholder value. This**

result is lower than the 3.25 dollars obtained by Jensen & Murphy (1990), lower than the 25.11 dollars obtained by Hall & Liebman (1998) and higher than the 0.14 euros obtained by Gomez (2019). **Most of the relationship between CEO incentives and firm performance corresponds to the private portfolio incentive, which highlights the importance of this incentive when studying executive compensation in Spanish firms.**

- viii. Regarding the Employee Stock Option Valuation Model (ESOV), this model represents an innovative approach to value employee stock options. In the literature so far, employee stock options have been valued using the Black-Scholes-Merton formula and applying inaccurate proxies to consider that these options tend to be exercised early. The Employee Stock Option Valuation Model incorporates the early exercise character of employee stock options into the calculations without applying any approximation. Consequently, **the Employee Stock Option Valuation Model is much more accurate than the Black-Scholes-Merton formula in determining the value of employee stock options. The deviation between both models may reach 75% of option value** as shown in the example of the following figure.

**Figure 45. Comparison between the Employee Stock Option Valuation Model and the Black-Scholes-Merton formula. Case of 4,874 options of Acciona Plan 2011 valued as of 31 December 2014**

Model	Approximation for the exercise date	Valuation (Euros)	Deviation (% over ESOV)
Employee Stock Option Valuation Model	N/A	61,180	-
Black-Scholes-Merton	First date of the exercise period	15,597	-74.5%
Black-Scholes-Merton	End date of the exercise period	66,004	7.9%

Source: IARCs, IAGCs, Bloomberg, financial models developed in this research and own preparation



## 10.2 Conclusions (Spanish Version, *Conclusiones*)

A continuación se recogen las conclusiones alcanzadas en el análisis desarrollado en la presente Tesis Doctoral:

- i. El diseño de la retribución de los ejecutivos en las empresas españolas se caracteriza por la **relevancia del bonus a corto plazo** (que representa en promedio el 35% de la retribución total estimada) y el **escaso uso de acciones restringidas y opciones sobre acciones**. Además de los incentivos retributivos, **los ejecutivos de las empresas españolas tienen un incentivo adicional derivado de su inversión privada en acciones de la empresa**, el cual representa en promedio el 155% de su retribución total estimada.
- ii. Con respecto a la evolución de las remuneraciones e incentivos de los CEO durante el período de observación, la evidencia encontrada muestra que:
  - a. **La remuneración estimada de los ejecutivos tuvo un incremento del 8,03% anual durante el periodo de observación**. Este crecimiento de la retribución estimada se debe en un 67,16% al incremento del bonus a corto y largo plazo. El impacto de la variación anual de la cartera de acciones restringidas y opciones sobre acciones es relativamente pequeño debido al escaso uso de estos incentivos en las empresas españolas.

- b. **El bonus a corto plazo es el incentivo retributivo más relevante del periodo de observación** (representando en promedio el 35% de la retribución total estimada) seguido del bonus a largo plazo (que representa en promedio el 11% de la retribución total estimada).
- c. **Casi todos los ejecutivos (98% del total de observaciones) tenían planes de bonus a corto plazo**, y una proporción significativa de ejecutivos (**80% del total de observaciones**) tenía incentivos a largo plazo (bonus a largo plazo, opciones sobre acciones o acciones restringidas).
- d. **Casi todos los ejecutivos (95% del total de observaciones) tenían inversión privada en acciones de la empresa** (inversión que podían liquidar en cualquier momento). Es importante mencionar la alta volatilidad de la variación anual de la cartera de acciones privadas, lo que implica que la riqueza generada por esta cartera varíe significativamente de un año a otro.

**Figure 46. Retribución media estimada e incentivos de la cartera privada entre 2013 y 2017 (en porcentaje sobre la retribución estimada)**

Descripción	2013	2014	2015	2016	2017	Total
Sueklos	35%	32%	33%	31%	29%	<b>31%</b>
Remuneración fija	3%	2%	3%	2%	2%	<b>2%</b>
Pertenencia a comisiones	1%	1%	1%	1%	1%	<b>1%</b>
Dietas	1%	1%	1%	1%	1%	<b>1%</b>
Sistemas de ahorro	9%	13%	12%	14%	15%	<b>13%</b>
Otros	2%	1%	3%	3%	2%	<b>2%</b>
Bonus a corto plazo	36%	37%	34%	33%	34%	<b>35%</b>
Bonus a largo plazo	8%	7%	11%	11%	15%	<b>11%</b>
Acc. restr. otorgadas	6%	3%	5%	5%	1%	<b>4%</b>
Opciones otorgadas	0%	3%	-	0%	0%	<b>1%</b>
<b>Remuneración estimada</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Var. anual acc. restringidas	3%	7%	-1%	0%	1%	<b>2%</b>
Var. anual opciones	8%	7%	4%	-2%	1%	<b>3%</b>
Var. anual acc. privadas	536%	161%	-10%	217%	-49%	<b>155%</b>
<b>Var. anual acc. y opciones</b>	<b>546%</b>	<b>175%</b>	<b>-7%</b>	<b>215%</b>	<b>-47%</b>	<b>160%</b>
<b>Var. en riqueza estimada</b>	<b>646%</b>	<b>275%</b>	<b>93%</b>	<b>315%</b>	<b>53%</b>	<b>260%</b>
Observaciones	33	35	36	39	33	<b>176</b>

Fuente: elaboración propia a partir de los datos incluidos en los IAGC y los IARC de las empresas

- iii. Con respecto al análisis del bonus a corto plazo (el incentivo más relevante de los planes de remuneración), la evidencia muestra que:
- a. **El bonus a corto plazo representa en promedio un importe superior al salario de los CEOs** en cada uno de los años del período de observación, excepto en 2013, en donde fue menor (representando en promedio el 98% del salario de los CEOs).
  - b. **El bonus a corto plazo casi siempre proporciona alguna remuneración a los ejecutivos** (solo el 4% de los bonus a corto plazo no proporcionó ninguna remuneración). **Sin embargo, es relativamente difícil para los ejecutivos alcanzar el importe máximo del bonus a corto plazo** (solo el 24% de los bonus a corto plazo proporcionaron el importe máximo).
  - c. **Los ingresos y las ventas son las variables cuantitativas más utilizadas en el cálculo de los bonus a corto plazo.** En promedio, los ingresos tuvieron un peso del 54% y las ventas del 12% en el cálculo del bonus a corto plazo. El resto de las variables cuantitativas tienen un peso mucho menor que los ingresos y las ventas en el cálculo de los bonus a corto plazo.

- iv. Con respecto a la comparación de la retribución de los CEO en España con la retribución de los CEO en otros países:
- a. **La remuneración salarial de los CEOs de las empresas españolas resulta mucho más baja en promedio que la remuneración salarial de los CEO de otros países.** En este sentido, hay algunos países (p.ej.: Francia, Alemania o Irlanda) en donde el salario medio de los CEO es más del doble que el salario medio que reciben los CEOs de las empresas españolas.
  - b. **Los bonus de los CEOs alcanzan la máxima relevancia en las empresas españolas,** en donde de media representan el 45% de la retribución total estimada de los CEOs, mientras que representan menos del 22% en otros países (excepto en Alemania, en donde alcanzan el 40%).
  - c. **La retribución mediante opciones sobre acciones y acciones restringidas es significativamente baja en las empresas españolas,** en donde de media tan solo representan el 5% de la retribución total estimada del CEO, mientras que en otros países representan un porcentaje significativamente superior (excepto en el caso de Suecia).

**Figure 47. Estructura retributiva estimada de los CEOs en diferentes países**

País	Nº Observ.	Salario medio (euros)	Salario mediano (euros)	Salario (%)	Bonus (%)	Opciones y Acc. restr. (%)	Otros (%)
Noruega	227	1.159.338	327.639	77%	10%	7%	7%
Suecia	659	1.444.972	562.867	65%	13%	2%	20%
Italia	488	2.831.137	1.629.794	57%	14%	9%	20%
Suiza	210	4.082.886	1.991.037	51%	14%	24%	10%
Irlanda	406	2.293.473	966.115	47%	15%	27%	11%
Reino Unido	3.957	1.923.829	1.075.328	48%	17%	26%	9%
Francia	1.455	2.117.052	739.288	63%	18%	16%	3%
Países Bajos	583	1.587.789	982.917	49%	19%	19%	13%
Bélgica	218	1.444.972	730.887	60%	20%	10%	11%
Alemania	582	2.612.711	1.621.393	42%	40%	10%	8%
<b>Media europea</b>	<b>N/A</b>	<b>2.149.816</b>	<b>1.062.727</b>	<b>56%</b>	<b>18%</b>	<b>15%</b>	<b>11%</b>
<b>Estados Unidos</b>	<b>13.361</b>	<b>4.116.490</b>	<b>2.352.280</b>	<b>30%</b>	<b>22%</b>	<b>42%</b>	<b>6%</b>
<b>España</b>	<b>176</b>	<b>1.038.733</b>	<b>856.500</b>	<b>31%</b>	<b>45%</b>	<b>5%</b>	<b>19%</b>

Fuente: elaboración propia a partir de los IAGC y los IARC, y Edmans et al. (2017)

- v. Con respecto a la relación existente entre la inversión del CEO en acciones de la empresa y los componentes de su remuneración:
- Existe una relación positiva entre la inversión privada del CEO (medida como porcentaje de la remuneración estimada) y los siguientes componentes de compensación del CEO: salario y otras remuneraciones (medidos como porcentaje de la remuneración estimada).
  - Existe una relación negativa entre la inversión privada del CEO (medida como porcentaje de la remuneración estimada) y los incentivos de su compensación (medidos como porcentaje de la remuneración estimada). Esto implica que **cuanto mayor es la inversión del CEO en acciones de la empresa, menores son los incentivos remuneratorios (bonus a corto y largo plazo, acciones restringidas y opciones sobre acciones) que se otorgan al CEO.**

- vi. Con respecto a la relación entre la inversión en acciones del CEO y las características del CEO / empresa:
- a. Existe evidencia que respalda una relación positiva entre la inversión en acciones del CEO (medidas en euros) y la edad del CEO, el otorgamiento de opciones sobre acciones y el hecho de que el CEO sea el fundador o un miembro de la familia fundadora. **La inversión privada de los CEOs en acciones de la empresa (medida en euros) es mayor a medida que el CEO envejece, que el CEO recibe opciones sobre acciones y que el CEO pertenezca a la familia fundadora.**
  
  - b. Existe evidencia que respalda una relación positiva entre la inversión en acciones del CEO (medida como porcentaje del capital total) y la edad del CEO, la dualidad asociada a ocupar también el cargo de Presidente, y el hecho de que el CEO sea el fundador o un miembro de la familia fundadora. **La inversión privada de los CEOs en acciones de la empresa (medida como porcentaje del capital total) aumenta a medida que el CEO envejece, que el CEO ocupe simultáneamente el puesto de CEO y Presidente y que el CEO pertenezca a la familia fundadora. Además, la participación del CEO (medida como porcentaje del capital total) disminuye con la antigüedad del CEO en su cargo y el tamaño de la empresa.**

- vii. **Con respecto al análisis de la relación existente entre los incentivos de los ejecutivos y el rendimiento de las empresas**, esta Tesis Doctoral ha encontrado **evidencia de una relación débil. Los CEOs reciben de media 0,49 euros por cada mil euros de valor generado para el accionista.** Este resultado es inferior a los 3,25 dólares obtenidos por Jensen & Murphy (1990), inferior a los 25,11 dólares obtenidos por Hall & Liebman (1998) y superior a los 0,14 euros obtenidos por Gómez (2019). **La mayor parte de la relación entre los incentivos de los CEOs y el rendimiento de las empresas corresponde al incentivo de la cartera privada**, lo que pone de relieve la **importancia de este incentivo a la hora de estudiar la retribución de los ejecutivos en las empresas españolas.**
- viii. Con respecto al Modelo de valoración de opciones sobre acciones para empleados (ESOVVM), cabe señalar que este modelo representa un enfoque innovador para valorar este tipo de opciones. En la literatura hasta el momento, las opciones sobre acciones de los empleados se han valorado utilizando la fórmula de Black-Scholes-Merton y utilizando aproximaciones para considerar que estas opciones tienden a ejercerse temprano. El modelo de valoración de opciones sobre acciones para empleados (ESOVVM) incorpora el carácter de ejercicio temprano en los cálculos sin necesidad de efectuar ninguna aproximación. En consecuencia, **el modelo de valoración de opciones sobre acciones para empleados resulta mucho más preciso que la fórmula de Black-Scholes-Merton. La desviación entre ambos modelos puede alcanzar el 75% del valor de la opción**, como se puede observar en el ejemplo recogido en la figura siguiente.

**Figure 48. Comparación entre el modelo de valoración de opciones sobre acciones para empleados (ESOVM) y la fórmula de Black-Scholes-Merton. Caso correspondiente a 4.874 opciones del Plan 2011 de Acciona valoradas a 31 de diciembre de 2014**

<b>Modelo</b>	<b>Aproximación de la fecha de ejercicio</b>	<b>Valoración (euros)</b>	<b>Desviación (% sobre ESOVM)</b>
ESOVM	N/A	61.180	-
Black-Scholes-Merton	Primera fecha del periodo de ejercicio	15.597	-74,5%
Black-Scholes-Merton	Última fecha del periodo de ejercicio	66.004	7,9%

*Fuente: IARC, IAGC, Bloomberg, modelo ESOVM desarrollado en esta investigación y elaboración propia*

## **11 Limitations and Future Research**

The current Dissertation has performed a wide analysis on executive compensation in Spanish firms. This analysis is based on the detailed information on executive compensation published by Spanish firms in the IAGCs and the IARCs between 2013 and 2017.

Despite the IAGCs and IARCs contain highly detailed data regarding executive compensation, the information regarding the private investment of the CEO in company's shares is limited. In particular, the IAGCs and IARCs only have information regarding the investment of the CEO in company's share at the end of the year and, therefore, there is no information regarding CEOs' acquisitions and disposals of company's shares during the year, which represents a limitation of the current research.

The current research has also been limited to establish a causal relationship. Despite the available information in the IAGCs and IARCs, it has not been possible to find a valid identification instruments and, therefore, to establish a causal relationship in the analysis. Consequently, finding a valid identification instrument constitutes an opportunity for future research.

Another opportunity for future research lies on extending the period of analysis. While the current research has focused on the period 2013-2017, additional research could incorporate information for years thereafter.

It would also be possible to study salary differences among executives and to evaluate the reasons for these differences. As mentioned, the available information regarding executive compensation in Spanish firms is very rich and, therefore, it would allow to carry out a deep analysis into compensation differences among executives.

It would also be possible to extend the present research by incorporating the analysis of ESG (environmental, social and corporate governance) objectives. ESG objectives have become increasingly important for corporations in recent years. And compensation plans are becoming more and more associated with ESG objectives. Therefore, an extension of the present research could analyze the relationship between executive incentives and ESG objectives.

Regarding the Employee Stock Option Valuation Model, it would be possible to extend this model in future research, incorporating option characteristics such as relative performance (i.e., considering that the payoff will depend on the stock price increase relative to peer companies). In this way, the Employee Stock Option Valuation Model could be used to value this kind of stock options.

## **Appendix I. Initial Version of the Employee Stock Option Valuation Model (ESOV<sub>M</sub><sub>i</sub>)**

The code I designed and programmed in Matlab to value employee stock options is presented here (initial version):

```
function Executive_Stock_Option_Val (nvals, no_options, strike, exercise_start,
maturity, Pi, vol, div, rf)

format bank;

for nval = 1:nvals

    npaths = 10000;

    steps_per_year = 52;

    early_exercise_perc = 0.90;

    dt = 1/steps_per_year;

    nsteps = round(steps_per_year * maturity(nval), 0);

    exercise_initial_step = max(round(exercise_start(nval) * steps_per_year, 0), 1);

    Prices = zeros(npaths, nsteps);
```

```
for i = 1:npaths

    random_numbers = randn(1, nsteps);

    Prices(i,1) = Pi(nval) * exp( (rf(nval) - div(nval) - (vol(nval)^2)/2) * dt + vol(nval)
* sqrt(dt) * random_numbers(1) );

    for j = 2:nsteps

        Prices(i,j) = Prices(i, j-1) * exp( (rf(nval) - div(nval) - (vol(nval)^2)/2)* dt +
vol(nval) * sqrt(dt) * random_numbers(1,j) );

    end

end

BS_vals = zeros (npaths, nsteps);

intrinsic = zeros (npaths, nsteps);

for i= 1:npaths

    for j = 1:nsteps

        d1 = (log(Prices(i,j)/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) * (nsteps
- j)/steps_per_year) / (vol(nval) * sqrt((nsteps - j)/steps_per_year));

        d2 = d1 - vol(nval) * sqrt((nsteps - j)/steps_per_year);
```

```
BS_vals(i,j) = Prices(i,j) * exp(-div(nval) * (nsteps - j)/steps_per_year) *  
normcdf(d1) - strike(nval) * exp(-rf(nval) * (nsteps - j)/steps_per_year) * normcdf(d2);
```

```
intrinsic(i,j) = Prices(i,j) - strike(nval);
```

```
end
```

```
end
```

```
Payoff = zeros(npaths, nsteps);
```

```
df_vector = zeros (1, nsteps);
```

```
for i = 1:npaths
```

```
exercised = 0;
```

```
j = exercise_initial_step;
```

```
while exercised == 0
```

```
if j < nsteps
```

```
if (intrinsic(i,j) > 0) && (intrinsic(i,j) >= (BS_vals(i,j) * early_exercise_perc))
```

```
Payoff(i,j) = intrinsic(i,j);
```

```
exercised = 1;
```

```
        end

    else

        Payoff(i,j) = max(0, intrinsic(i,j));

        exercised = 1;

    end

    j = j + 1;

end

end

for j = 1:nsteps

    df_vector(1,j) = 1 / exp(rf(nval) * j/steps_per_year);

end

if exercise_start(nval) == 0

    price_BS_init_exerc(nval) = max(Pi(nval) - strike(nval),0) * no_options(nval) /
1000;
```

```

else

    d1 = (log(Pi(nval)/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) *
exercise_start(nval)) / (vol(nval) * sqrt(exercise_start(nval)));

    d2 = d1 - vol(nval) * sqrt(exercise_start(nval));

    price_BS_init_exerc(nval) = (Pi(nval) * exp(-div(nval) * exercise_start(nval)) *
normcdf(d1) - strike(nval) * exp(-rf(nval) * exercise_start(nval)) * normcdf(d2) ) *
no_options(nval) / 1000;

end

d1 = (log(Pi(nval)/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) *
maturity(nval)) / (vol(nval) * sqrt(maturity(nval)));

d2 = d1 - vol(nval) * sqrt(maturity(nval));

price_BS_mat(nval) = (Pi(nval) * exp(-div(nval) * maturity(nval)) * normcdf(d1) -
strike(nval) * exp(-rf(nval) * maturity(nval)) * normcdf(d2)) * no_options(nval) / 1000;

if (Pi(nval) - strike(nval)) >= price_BS_mat(nval)

    price_MC(nval) = (Pi(nval) - strike(nval)) * no_options(nval) / 1000;

else

    price_MC(nval) = sum(mean(Payoff) .* df_vector) * no_options(nval) / 1000;

```

```
end
```

```
end
```

```
disp("   BS_init   MC   BS_mat")
```

```
disp([price_BS_init_exerc; price_MC; price_BS_mat]')
```

```
end
```

## **Appendix II. Optimized Version of the Employee Stock Option Valuation Model (ESOVM<sub>o</sub>)**

The code I designed and programmed in Matlab to value employee stock options is presented here (optimized version):

```
function Option_Val_v6(nvals, no_options, strike, exercise_start, maturity, Pi, vol, div,
rf)

format bank;

price_BS_init_exerc = zeros(nvals,1);

price_BS_mat = zeros(nvals,1);

price_MC = zeros(nvals,1);

for nval = 1:nvals

    npaths = 10000;

    steps_per_year = 52;

    dt = 1/steps_per_year;

    early_exercise_perc = 0.90;
```

```

nsteps = round(steps_per_year * maturity(nval), 0);

exercise_initial_step = max(round(exercise_start(nval) * steps_per_year, 0), 1);

df_vector = exp(-rf(nval) * [1:nsteps]/steps_per_year);

if exercise_start(nval) == 0

    price_BS_init_exerc(nval) = max(Pi(nval) - strike(nval),0) * no_options(nval) /
1000;

else

    d1 = (log(Pi(nval)/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) *
exercise_start(nval)) / (vol(nval) * sqrt(exercise_start(nval)));

    d2 = d1 - vol(nval) * sqrt(exercise_start(nval));

    price_BS_init_exerc(nval) = (Pi(nval) * exp(-div(nval) * exercise_start(nval)) *
normcdf(d1) - strike(nval) * exp(-rf(nval) * exercise_start(nval)) * normcdf(d2) ) *
no_options(nval) / 1000;

end

d1 = (log(Pi(nval)/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) *
maturity(nval)) / (vol(nval) * sqrt(maturity(nval)));

d2 = d1 - vol(nval) * sqrt(maturity(nval));

```

```
price_BS_mat(nval) = (Pi(nval) * exp(-div(nval) * maturity(nval)) * normcdf(d1) -
strike(nval) * exp(-rf(nval) * maturity(nval)) * normcdf(d2)) * no_options(nval) / 1000;
```

```
if (exercise_start == 0) & ((Pi(nval) - strike(nval)) >= price_BS_mat(nval) *
early_exercise_perc)
```

```
price_MC(nval) = (Pi(nval) - strike(nval)) * no_options(nval) / 1000;
```

```
else
```

```
for i = 1:npaths
```

```
executed = 0;
```

```
Prices = Pi(nval) * exp( (rf(nval) - div(nval) - (vol(nval)^2)/2) * dt + vol(nval)
* sqrt(dt) * randn );
```

```
for j = 1:nsteps-1
```

```
if j < exercise_initial_step
```

```
Prices = Prices * exp( (rf(nval) - div(nval) - (vol(nval)^2)/2) * dt +
vol(nval) * sqrt(dt) * randn );
```

```
else
```

```
d1 = (log(Prices/strike(nval)) + (rf(nval) - div(nval) + vol(nval)^2/2) *
(nsteps - j)/steps_per_year) / (vol(nval) * sqrt((nsteps - j)/steps_per_year));
```

```
d2 = d1 - vol(nval) * sqrt((nsteps - j)/steps_per_year);

BSvals = Prices * exp(-div(nval) * (nsteps - j)/steps_per_year) *
normcdf(d1) - strike(nval) * exp(-rf(nval) * (nsteps - j)/steps_per_year) * normcdf(d2);

if (Prices - strike(nval)) >= (BSvals * early_exercise_perc)

    price_MC(nval) = price_MC(nval) + (Prices - strike(nval)) *
no_options(nval) / 1000 * df_vector(j) / npaths;

    executed = 1;

    break;

else

    Prices = Prices * exp( (rf(nval) - div(nval) - (vol(nval)^2)/2) * dt +
vol(nval) * sqrt(dt) * randn );

    end

end

end

if executed == 0
```

```
        price_MC(nval) = price_MC(nval) + max(Prices - strike(nval),0) *  
no_options(nval) / 1000 * df_vector(j) / npaths;  
  
    end  
  
end  
  
end  
  
disp(nval)  
  
end  
  
disp("    BS_init    MC    BS_mat")  
  
disp([price_BS_init_exerc price_MC price_BS_mat])  
  
end
```



## **Appendix III. Monte Carlo Restricted Share Valuation Model used to Value Telefonica Restricted Shares (Plan 2014 and Plan 2015)**

I designed, programmed and verified a financial model to value Telefonica's Plan 2014 and Plan 2015 of restricted shares. The consolidation of these shares was subject to the evolution of the fourteen companies that were part of the DJ Global Sector Titans Telecommunications Index.

This financial model applies the Monte Carlo approach. The Monte Carlo methodology considers that stock prices are lognormally distributed, which is a common assumption in the valuation of stock options (the Black-Scholes-Merton approach also uses this assumption). The lognormal distribution of stock prices is defined by the following formula (Hull, 2015).

$$\ln S_t \sim f\left(\ln S_{t-1} + \left(\mu - \frac{\sigma^2}{2}\right)\partial\tau, \sigma^2\tau\right) \quad (16)$$

Applying Ito's lemma on the previous equation, the stochastic process followed by stock prices is defined by the following formula (Hull, 2015):

$$\partial \ln S = \left(\hat{\mu} - \frac{\sigma^2}{2}\right)\partial\tau + \sigma \partial\phi \partial\tau \quad (17)$$

In addition, the financial model to value Telefonica's restricted shares implements correlated geometric Brownian motions for the fifteen companies at consideration (it is necessary to simulate the prices of the fourteen companies of the DJ Global Sector Titans Telecommunications Index plus the price of Telefonica).

The correlated geometric Brownian motion of stock prices is based on a Wiener process with correlated random numbers. The correlated random numbers were generated using the random number generator of Matlab and applying the Cholesky decomposition to the correlation matrix (I used Bloomberg to obtain the data of the correlation matrices used in the calculations).

The Cholesky decomposition of the correlation matrix is determined using equation (18) for the numbers of the main diagonal, and equation (19) for the rest of the elements.

$$c_{i,i}^{2'} = h_{i,i} - \sum_{j=1}^{i-1} c_{i,j}^2 \quad (18)$$

$$c'_{i,j} = (h_{i,i} - \sum_{j=1}^{j-1} c_{i,j} \times c_{i,j}) / c_{i,j} \quad (19)$$

Once I developed the financial model using the Monte Carlo approach, I verified that it worked correctly comparing the results of plain vanilla European options on the simulated stocks prices with the results of the Black-Scholes-Merton approach.

The Matlab code of the financial model I designed to value Telefonica's restricted shares corresponding to Plan 2014 and Plan 2015 is presented here:

```
function [Valuation_MC, Valuation_BS] = Telefonica_Financial_Model (no_options,  
maturity, rf, Pi_Tef, Div_Tef, Pi, vol, corr_matrix)
```

```
format bank;
```

```
npaths = 100000;
```

```
steps_per_year = 1;
```

```
dt = 1/steps_per_year;
```

```
nsteps = round(steps_per_year * maturity, 0);
```

```
nstocks = length(Pi);
```

```
d1 = (log(Pi(15)/Pi(15)) + (rf + vol(15)^2/2) * maturity) / (vol(15) * sqrt(maturity));
```

```
d2 = d1 - vol(15) * sqrt(maturity);
```

```
Valuation_BS = (Pi(15) * normcdf(d1) - Pi(15) * exp(-rf * maturity) * normcdf(d2)) *  
no_options / 1000;
```

```
Valuation_MC = 0;
```

```
Valuation_MC_BS = 0;
```

```
for i = 1:npaths
```

```
corr_random = chol(corr_matrix, 'lower') * randn(nstocks, 1);

Prices = Pi .* exp( (rf - (vol.^2)/2) .* dt + vol .* sqrt(dt) .* corr_random );

Price_Tef = Pi_Tef * exp( (rf - Div_Tef - (vol(end))/2) * dt + vol(end) * sqrt(dt) *
corr_random(end) );

for j = 2:nsteps

    corr_random = chol(corr_matrix, 'lower') * randn(nstocks, 1);

    Prices = Prices .* exp( (rf - (vol.^2)/2) .* dt + vol .* sqrt(dt) .* corr_random );

    Price_Tef = Price_Tef * exp( (rf - Div_Tef - (vol(end))/2) * dt + vol(end) *
sqrt(dt) * corr_random(end) );

end

if Prices(end) < prctile(Prices(1:end-1), 50)

    no_options_payoff = 0;

else

    if Prices(end) >= prctile(Prices(1:end-1), 90)

        no_options_payoff = no_options * 1.25;

    else
```

```
if Prices(end) < prctile(Prices(1:end-1), 75)

    for i = 51:75

        if Prices(end) < prctile(Prices(1:end-1), i)

            no_options_payoff = no_options * (0.30 + 0.028 * (i - 0.5));

        end

    end

end

else

    for i = 76:90

        if Prices(end) < prctile(Prices(1:end-1), i)

            no_options_payoff = no_options * (1.00 + 0.0166667 * (i - 0.5));

        end

    end

end

end

end
```

```
Valuation_MC = Valuation_MC + Price_Tef / exp(rf * maturity) / 1000 / npaths *  
no_options_payoff;  
  
end  
  
end
```

## **Appendix IV. Spanish Regulation on the Disclosure of Executive Compensation**

The Spanish regulation regarding the disclosure of executive compensation is formed by:

- Laws enacted by the Parliament.
- Royal Decrees and Royal-Decrees Laws enacted by the Government.
- Orders enacted by the Ministries, especially the Ministry of Economy and Taxation.
- Circulars enacted by the CNMV.
- Good Governance Codes published by the CNMV. These codes are not legally enforceable, but companies are required by the legislation to explain the reasons when they decide not to comply with their recommendations. In this way, the Spanish regulation follows the “comply or explain” principle.

The Spanish regulation has required to disclose information about executive compensation and stock holdings through the following methods:

- i. The Annual Corporate Governance Report (“**IAGC**”, according to the Spanish acronym), first introduced by Law 26/2003. The first IAGC corresponds to fiscal year 2003, which did not have any standard form. The standard form for this report was introduced by Circular 1/2004, which is applicable to IAGCs of fiscal year 2004 and thereafter.

- ii. The Annual Director's Remuneration Report (IARC), first introduced by Royal-Decree Law 1/2010. The first IARC corresponds to fiscal year 2011, which did not have any standard form. The standard form for this report was introduced by Circular 4/2013, which is applicable to IARCs of fiscal year 2013 and thereafter.
  
- iii. Publication of price sensitive information ("*hechos relevantes*"). This mechanism allows companies to publish information that might affect the price of their stock. These publications are available in the CNMV webpage.

## **Appendix IV.1 Spanish Regulation**

The Spanish regulation since 1990 regarding the disclosure of executive compensation information consists of the following legislation:

- Royal Decree 377/1991.
- Law 55/1999.
- Royal Decree 1370/2000.
- Circular 4/2000.
- Law 26/2003.
- Order ECO/3722/2003.
- Circular 1/2004.
- Royal Decree 1362/2007.
- Circular 7/2007.
- Royal-Decree Law 1/2010.
- Law 2/2011.
- Order ECC/461/2013.
- Circular 4/2013.
- Circular 5/2013.

Some of these regulations (Law 55/1999 and Law 2/2011) introduced their changes modifying Law 24/1988, which is known as the Stock Market Law.

The following Sections describe Spanish regulations regarding the disclosure of executive compensation information.

#### **Appendix IV.1.1 Royal Decree 377/1991**

Royal Decree 377/1991 (of 15 March) required executives (Administrators and Members of the Board of Directors) of publicly traded companies to communicate every acquisition or transmission of shares of their companies. This communication should take place within a seven day period.

#### **Appendix IV.1.2 Law 55/1999**

Law 55/1999 (of 29 December) modified the Law 24/1988 (known as the *Stock Market Law*), introducing an *Additional Disposition* that required the disclosure of executive stock options and share-based compensation plans before these plans were executed or cancelled. Specifically, Law 55/1999 required the registration of a Supplement with individualized information about shares, options or liquidations.

#### **Appendix IV.1.3 Royal Decree 1370/2000**

Royal Decree 1370/2000 (of 7 July) modified Article 5 and introduced a new Chapter in Royal Decree 377/1991. In particular, Royal Decree 1370/2000 introduced the obligation to disclose executive's stock options acquisitions or transmissions (and rights to acquire stocks such as warrants or convertible bonds), specifying the following aspects:

- a) Type of the right of the option.

- b) Contract or benefit that derived in the acquisition of the options.
- c) Description of the underlying shares, detailing the initial stock price as well as the stock price at the exercise date.
- d) Period in which the option can be exercised.
- e) Description of the conditions to transmit the option, if applicable.
- f) Premium (or other benefit) paid to acquire the option, if applicable.
- g) Alternatives to finance the acquisition or the hedge of the options, if applicable.
- h) Number of options that are acquired and total number of options held after the acquisition.
- i) Estimation of the number of shares that would be acquired as a result of exercising the options.

In addition, Royal Decree 1370/2000 required companies and executives to communicate the award or modification of executive compensation plans where stock options could be granted. This communication should be done as "relevant events" ("*hechos relevantes*" in Spanish) within a 7 day period, and it should include all the available information that has been detailed above.

#### **Appendix IV.1.4 Circular 4/2000**

On the 2 of August of 2000, CNMV issued Circular 4/2000, where it established the compulsory standard form to report the information associated with the stock options held by individual executives (regulated in Articles 1 and 5 of Royal Decree 377/1991, being Article 5 modified by Royal Decree 1370/2000). In addition, Circular 4/2000 also established the recommended (hence, not compulsory) standard form to report the description of share based compensation plans.

#### **Appendix IV.1.5 Law 26/2003**

Law 26/2003 (of 17 July) modified Law 24/1988 (known as the *Stock Market Law*), requiring Spanish listed companies to prepare the Annual Corporate Governance Report (“**IAGC**”, according to the Spanish acronym). The IAGC should have the following content:

- a) Ownership structure of the firm.
- b) Corporate Governance structure of the firm.
- c) Related-party transactions with shareholders or directors.
- d) Risk management system.
- e) Functioning of the Shareholder General Meeting.

- f) Degree of the company's compliance with Corporate Governance recommendations.

Law 26/2003 established that the Ministry of Economy and Taxation (or the CNMV if expressly authorised) would develop the necessary technical or legislative specifications of the IAGC. Law 26/2003 also established that the IAGC should be made publicly available through a price sensitive information communication (“*hecho relevante*”).

#### **Appendix IV.1.6 Order ECO/3722/2003**

Order ECO/3722/2003 (of 26 December) was issued by the Ministry of the Economy and Taxation and mentioned the same content for the IAGC as Law 26/2003. In addition, Order ECO/3722/2003 authorized the CNMV to regulate the specific content and format of the IAGC. It also established that companies should publish the IAGC in their corporate webpage and communicate it to the CNMV as price sensitive information (“*hecho relevante*”).

#### **Appendix IV.1.7 Circular 1/2004**

Circular 1/2004 (of 17 March) established the standard form of the IAGC of Spanish limited liability listed companies.

#### **Appendix IV.1.8 Royal Decree 1362/2007**

Royal Decree 1362/2007 (of 19 October) required executives to disclose the following information regarding stock option and share based compensation plans (this is the same

information required by Royal Decree 377/1991 after being modified by Royal Decree 1370/2000; Royal Decree 377/1991 was revoked by Royal Decree 1362/2007):

- a) Type of the right of the option.
- b) Contract or benefit that derived in the acquisition of the options.
- c) Description of the underlying shares, detailing the initial stock price as well as the stock price at the exercise date.
- d) Period in which the option can be exercised.
- e) Description of the conditions to transmit the option, if applicable.
- f) Premium (or other benefit) paid to acquire the option, if applicable.
- g) Alternatives to finance the acquisition or the hedge of the options, if applicable.
- h) Number of options that are acquired and total number of options held after the acquisition.
- i) Estimation of the number of shares that would be acquired as a result of exercising the options.

In addition, Royal Decree 1362/2007 (Article 47) required publicly traded companies to communicate their option and/or share based compensation plans to the CNMV as price

sensitive information (“*hecho relevante*”), with the detailed information specified above in case it was known at the date of the communication. This communication should be done within four working days since the issuance of these compensation schemes.

#### **Appendix IV.1.9 Circular 7/2007**

Circular 7/2007 (of 27 December) modified the standard form of the IAGC approved by Circular 1/2004 and that applied to Spanish limited liability listed companies.

#### **Appendix IV.1.10 Royal-Decree Law 1/2010**

Royal-Decree Law 1/2010 (of 2 July) published the consolidated text of the new law of Spanish limited liability companies. Royal-Decree Law 1/2010 refers to the IAGC and also introduced the Annual Director’s Remuneration Report (IARC).

Royal-Decree Law 1/2010 established that Spanish publicly listed limited liability companies should annually published the IAGC and the IARC, and also communicate them to the CNMV as price sensitive information (“*hecho relevante*”). Royal Decree Law 1/2010 also stipulated that the Ministry of Economy and Taxation (or the Spanish Securities & Exchange Commission [CNMV] if expressly authorised) would determine the specific content and structure of the IAGC and the IARC.

Regarding the IAGC, Royal-Decree Law 1/2010 established that it should have the following content:

- a) Ownership structure.

- b) Restrictions to the transmissibility of the stock and restrictions in terms of voting rights.
- c) Corporate governance structure of the company, which should include:
  - Any significant ownership participation of the Directors of the Board.
  - Information about the agreements between the company and the Directors regarding severance payments or indemnities in case of public tender offers for the acquisition of the firm.
- d) Related-party transactions with shareholders or directors.
- e) Risk management system.
- f) Functioning of the Shareholder General Meeting.
- g) Degree of the company's compliance with Corporate Governance recommendations.
- h) Description of the main characteristics of internal control systems and risk management in relation to the publication of financial information.

Regarding the IARC, Royal-Decree Law 1/2010 established that it should include:

- a) A *“complete, clear and understandable information about the compensation policy of the Directors of the Board for the current year and the forecasted policy for future years.”*
  
- b) Information *“about how the compensation policy was applied during the fiscal year, with the detail of individual compensation accrued to each Director of the Board.”*

#### **Appendix IV.1.11 Law 2/2011**

Law 2/2011 (of 4 March) modified Law 24/1988 (known as the *Stock Market Law*), including the requirements related to the IAGC and the IARC that were described in Royal-Decree-Law 1/2010. Law 2/2011 also established that the Ministry of Economy and Taxation (or the CNMV, if expressly authorised) would determine the specific content and structure of the IARC.

#### **Appendix IV.1.12 Order ECC/461/2013**

Order ECC/461/2013 (of 20 March) developed the content and structure of the IAGC and the IARC for limited liability listed companies.

Regarding the IAGC, Order ECC/461/2013 established that the IAGC should include the following information:

- a) Ownership structure.

- b) Functioning of the Shareholder General Meeting.
- c) Corporate governance structure of the company, which should include:
  - Compensation of the Board of Directors.
  - Information about the agreements between the company and the Directors regarding severance payments or indemnities in case of public tender offers for the acquisition of the firm.
- d) Related-party transactions with shareholders or directors and intra-group transactions.
- e) Risk management system.
- f) Description of the main characteristics of internal control systems and risk management in relation to the publication of financial information.
- g) Degree of the company's compliance with Corporate Governance recommendations.

Regarding the IARC, Order ECC/461/2013 established that the IARC should include the following information:

- 1) Information of the compensation policy of the current fiscal year, specifying:

- a) Fixed components, expenses and variable components, as well as the performance criteria associated with the variable components. Particularly, it should include information about:
  - i. Stock options.
  - ii. Share-based compensation.
  - iii. Severance payment agreements.
  - iv. Contribution to pension plans.
- b) Main characteristics of welfare systems, with an estimation of their annual cost.
- c) Requirements of the contracts of the Directors of the Board.
- d) Most significant changes in the compensation policy since the previous year.
- e) Information about the process to establish the compensation policy.
- f) Information about measures adopted by the company in the compensation policy to reduce excessive risk-taking, and information about compensation incentive linked to the long-term objectives of the firm.

- g) Information about the time frame for the consolidation of restricted shares.
- 2) Forecast of the compensation policy for future years.
  - 3) Summary of the compensation policy for the previous year.
  - 4) Detail of individual compensation accrued to each Director of the Board during the year. Particularly, it should be available the following information for each individual member of the Board:
    - **Break-down of his/her compensation.**
    - **Detail of stock-options or stocks awarded.**
    - Relation between Board remuneration and company results.
    - Information about the voting of the IARC in the Shareholder Meeting.

Order ECC/461/2013 established that Spanish limited liability listed companies should annually published the IAGC and the IARC, and also communicate them to the CNMV as price sensitive information (“*hecho relevante*”). Order ECC/461/2013 also **required the CNMV to determine the specific content and structure of the IAGC and the IARC within three months after Order ECC/461/2013 was enacted.**

Finally, Order ECC/461/2013 revoked Order ECO/3722/2003 and maintained in force Circular 1/2004 and Circular 4/2007 until the CNMV would enact a new Circular about the content and structure of the IAGC.

#### **Appendix IV.1.13 Circular 4/2013**

Circular 4/2013 (of 12 June) established the standard form of the IARC of Spanish limited liability listed companies.

#### **Appendix IV.1.14 Circular 5/2013**

Circular 5/2013 (of 12 June) established the standard form of the IAGC of Spanish limited liability listed companies.

## **Appendix IV.2 Good Governance Codes**

In Spain, the CNMV has published the following Good Governance Codes:

- Unified Good Governance Code of Listed Companies of 2006 (hereinafter, **GGC 2006**).
- Unified Good Governance Code of Listed Companies of 2013 (hereinafter, **GGC 2013**).
- Good Governance Code of Listed Companies of 2015 (hereinafter, **GGC 2015**).

As specified in GGC 2015 (page 9), “*Spanish legislation leaves it up to companies to decide whether or not to follow these corporate governance recommendations, but requires them to give a reasoned explanation for any deviation, so that shareholders, investors and the markets in general can arrive at an informed judgement.*” This approach of the regulation is internationally known as “comply or explain” approach.

The following Sections describe the Good Governance Codes that have been published by the CNMV.

### **Appendix IV.2.1 Unified Good Governance Code of Listed Companies of 2006**

Order ECO/3722/2003 required the CNMV to prepare a document regarding recommended practices in corporate governance. As a result, the CNMV published the Unified Good Governance Code of Listed Companies in 2006. The GGC 2006 established

recommendations on Board composition, diversity, compensation and functioning. In the particular area of compensation, the GGC 2006 (page 33) mentioned that “*complete transparency regarding directors’ remuneration, including total payments to executive directors, is a way to mitigate the risk of immoderate compensation*” and that “*this transparency should extend to all remuneration components and concepts, including director severance packages.*” In addition, the GGC 2006 recommended that:

- a) “*Director remuneration should suffice to attract and retain the right kind of person but not be so high as to compromise their independence*” (GGC 2006, p. 35).
- b) “*In the case of variable awards, remuneration policies should include technical safeguards to ensure they reflect the professional performance of the beneficiaries and not simply the general progress of the markets or the company’s sector, atypical or exceptional transactions or circumstances of this kind*” (GGC 2006, p. 35).
- c) “*The board should submit a report on the directors’ remuneration policy to the advisory vote of the General Shareholders’ Meeting, as a separate point on the agenda*” (GGC 2006, p. 36).
- d) “*The notes to the annual accounts should list individual directors’ remuneration in the year, including*” (GGC 2006, p. 37):

- *“Contributions to the director’s pension plan”* (GGC 2006, p. 37).
- *“Severance packages agreed or paid”* (GGC 2006, p. 37).
- *“Shares or options awarded in the year and the terms set for their execution”* (GGC 2006, p. 37), such as *“number of options exercised in the year”* (GGC 2006, p. 38), *“number of options outstanding at the annual close”* (GGC 2006, p. 38), or *“any change in the year in the exercise price”* (GGC 2006, p. 38).
- *“Relation in the year between the remuneration obtained by executive directors and the company’s profits, or some other measure of enterprise results”* (GGC 2006, p. 38).

#### **Appendix IV.2.2 Unified Good Governance Code of Listed Companies of 2013**

The CNMV published an updated version of the Unified Good Governance Code of Listed Companies in 2013. The GGC 2013 adapted or eliminated recommendations affected by new legislation (according to GGC 2015), but it did not introduce any relevant change in the disclosure requirements of directors’ compensation in relation to GGC 2006.

#### **Appendix IV.2.3 Good Governance Code of Listed Companies of 2015**

Good Governance Code of Listed Companies 2015 (of February) mentions that *“the structure, level, fixing and transparency regime of directors’ remuneration is a key*

*element of any company's good corporate governance system"* (GGC 2015, p. 42) and that *"the experience of recent years has shown that remuneration structures are, at times, overly complex, excessively short-term oriented and lacking a reasonable correlation with the results obtained"* (GGC 2015, p. 42). In addition, the GGC 2015 recommended that:

- a) *"As a general rule, directors' remuneration should suffice to attract and retain talented individuals and compensate them for the dedication, abilities and responsibilities that the post demands, but should not be so high as to compromise the independent judgement of non-executive directors"* (GGC 2015, p. 42).
- b) *"Remuneration of non-executive directors should not include variable components linked to the director or the company's performance, the delivery of shares, options and other financial instruments or membership of the company's pension scheme, with some exceptions"* (GGC 2015, p. 42).
- c) *"Variable remuneration linked to the company and the director's performance, the award of shares, options or any other right to acquire shares or to be remunerated on the basis of share price movements, and membership of long-term savings schemes such as pension plans should be confined to executive directors"* (GGC 2015, p. 43).

*“The company may consider the share-based remuneration of non-executive directors provided they retain such shares until the end of their mandate” (GGC 2015, p. 43).*

- d) *“A major part of variable remuneration components should be deferred for a long enough period to ensure that predetermined performance criteria have effectively been met” (GGC 2015, p. 44).*
- e) *“A major part of executive directors’ variable remuneration should be linked to the award of shares or financial instruments whose value is linked to the share price” (GGC 2015, p. 44).*
- f) *“Following the award of shares, share options or other rights on shares derived from the remuneration system, directors should not be allowed to transfer a number of shares equivalent to twice their annual fixed remuneration, or to exercise the share options or other rights on shares for at least three years after their award” (GGC 2015, p. 44).*

*“The above condition will not apply to any shares the director must dispose of to defray costs related to their acquisition” (GGC 2015, p. 44).*

- g) *“Termination payments should not exceed a fixed amount equivalent to two years of the director’s total annual remuneration and should not be*

*paid until the company confirms that he or she has met the predetermined performance criteria” (GGC 2015, p. 45).*

h) *“Companies should give clear information to the shareholders’ general meeting concerning their degree of compliance with Good Governance Code recommendations” (GGC 2015, p. 16).*

i) *“Companies should disclose the following director particulars on their websites and keep them regularly updated” (GGC 2015, p. 25):*

- *“Background and professional experience” (GGC 2015, p. 25).*
- *“Directorships held in other companies” (GGC 2015, p. 25).*
- *“Statement of the director class to which they belong” (GGC 2015, p. 25).*
- *“Dates of their first appointment as a board member and subsequent re-elections” (GGC 2015, p. 25).*
- *“Shares held in the company, and any options on the same” (GGC 2015, p. 25).*

## Appendix IV.3 Summary

The following table summarizes the Spanish regulation regarding the disclosure of executive compensation information:

**Figure 49. Summary of Spanish regulation on the disclosure of executive compensation**

Regulation	Description
RD 377/1991	<ul style="list-style-type: none"> <li>– Required executives to disclose acquisitions and transmissions of shares of their companies.</li> </ul>
Law 55/1999	<ul style="list-style-type: none"> <li>– Modified Law 24/1988.</li> <li>– Required the disclosure of executive stock options and share-based compensation plans before these plans were executed or cancelled.</li> </ul>
RD 1370/2000	<ul style="list-style-type: none"> <li>– Modified RD 377/1991.</li> <li>– Disclosure of executive's stock options acquisitions or transmissions (and rights to acquire stocks such as warrants or convertible bonds), specifying several aspects (i.e., number, strike, exercise period).</li> <li>– Required companies and executives to communicate (within a 7 day period) the award or modification of executive compensation plans where stock options could be granted.</li> </ul>
Circular 4/2000	<ul style="list-style-type: none"> <li>– Compulsory standard form to report the information associated with stock options held by individual executives (required by RD 377/1991).</li> <li>– Recommended (hence, not compulsory) standard form to report the description of the share based compensation plans.</li> </ul>
Law 26/2003	<ul style="list-style-type: none"> <li>– <b>Introduced the IAGC</b>, where the company should detail the ownership structure and the degree of compliance with Corporate Governance recommendations.</li> </ul>

Regulation	Description
Order ECO/3722/2003	<ul style="list-style-type: none"> <li>– Authorized CNMV to regulate the content of the IAGC.</li> </ul>
Circular 1/2004	<ul style="list-style-type: none"> <li>– Established the standard form of the IAGC.</li> </ul>
RD 1362/2007	<ul style="list-style-type: none"> <li>– Revoked RD 377/1991 (which was modified by RD 1370/2000), but maintained its disclosure requirements.</li> <li>– Required publicly traded companies to communicate their option and/or share based compensation plans to the CNMV.</li> </ul>
Circular 7/2007	<ul style="list-style-type: none"> <li>– Modified the standard form of the IAGC.</li> </ul>
RDL 1/2010	<ul style="list-style-type: none"> <li>– <b>Introduced the IARC</b>, where companies had to disclose “<i>complete, clear and understandable information about the compensation policy</i>” of the Board.</li> <li>– Required companies to publish the IAGCC/IARC annually.</li> </ul>
Law 2/2011	<ul style="list-style-type: none"> <li>– Modified Law 24/1988, establishing that companies should prepare the IAGC and the IARC described in RDL 1/2010.</li> <li>– Established that the Ministry of the Economy and Taxation or the CNMV (if authorised) would determine the specific content and structure of the IARC.</li> </ul>
Order ECC/461/2013	<ul style="list-style-type: none"> <li>– Developed the content and structure of the IAGC and the IARC, requiring companies to detail stock options, share-based compensation, severance payment agreements and contributions to pension plans, with a break-down for the compensation of each individual director.</li> </ul>
Circular 4/2013	<ul style="list-style-type: none"> <li>– Established the standard form of the IARC.</li> </ul>
Circular 5/2013	<ul style="list-style-type: none"> <li>– Established the standard form of the IAGC.</li> </ul>

Source: Spanish Regulation

In 1991, RD 377/1991 required executives to communicate the acquisition and transmission of shares of their companies. In 1999, Law 55/1999 required companies to disclose executive stock options and share-based compensation plans. In 2000, RD 1370/2000 required the disclosure of executive's stock options acquisitions or transmissions (and the characteristics of these options). Circular 4/2000 published the standard form to report the information associated with stock options held by individual executives.

In 2003, Law 26/2003 introduced the IAGC, where companies had to detail information on their ownership structure and the degree of compliance with Corporate Governance recommendations (which were published by the CNMV through Good Governance Codes). In 2004, Circular 1/2004 established the standard form of the IAGC. Circular 7/2007 and Circular 5/2013 introduced an updated version of the standard form of the IAGC.

In 2010, RDL 1/2010 introduced the IARC, where companies had to detail information on the compensation of the Board of Directors, including a break-down for each individual director. Circular 4/2013 established the standard form of the IARC.

In addition to the previous requirements, the CNMV published a guide for good governance practices of listed companies (Good Governance Codes) in 2006, 2013, and 2015. The following table summarizes these Good Governance Codes in relation to recommendations about the disclosure of executive compensation information:

**Figure 50. Summary of Good Governance Codes’ recommendations on the disclosure of executive information**

Good Gov. Code	Recommendations
GGC 2006	<ul style="list-style-type: none"> <li>– Mentioned (not recommended) that “<i>complete transparency regarding directors’ remuneration, including total payments to executive directors, is a way to mitigate the risk of immoderate compensation</i>” (GGC 2006, p. 33) and that “<i>this transparency should extend to all remuneration components and concepts, including director severance packages</i>” (GGC 2006, p. 33).</li> <li>– “<i>The notes to the annual accounts should list individual directors’ remuneration in the year, including</i>” (GGC 2006, 37): <ul style="list-style-type: none"> <li>▪ “<i>Contributions on the director’s behalf to defined-contribution pension plans</i>” (GGC 2006, p. 37).</li> <li>▪ “<i>Severance packages agreed or paid</i>” (GGC 2006, p. 37).</li> <li>▪ “<i>Shares or options awarded in the year, and the terms set for their execution</i>” (GGC 2006, p. 37).</li> <li>▪ “<i>Relation in the year between the remuneration obtained by executive directors and the company’s profits, or some other measure of enterprise results</i>” (GGC 2006, p. 38).</li> </ul> </li> </ul>
GGC 2013	<ul style="list-style-type: none"> <li>– “<i>Adapt or eliminate recommendations affected by new legislation</i>” (GGC 2015, p. 7), but it did not introduce any relevant change in the disclosure requirements of GGC 2006.</li> </ul>
GGC 2015	<ul style="list-style-type: none"> <li>– Mentioned (not recommended) that “<i>the structure, level, fixing and transparency regime of directors’ remuneration is a key element of any company’s good corporate governance system</i>” (GGC 2015, p. 42) and that “<i>the experience of recent years has shown that remuneration structures are, at times, overly complex, excessively short-term oriented and lacking a reasonable correlation with the results obtained</i>” (GGC 2015, p. 42).</li> </ul>

Good Gov. Code	Recommendations
	<ul style="list-style-type: none"> <li>– <i>“Remuneration of non-executive directors should not include variable components linked to the director or the company’s performance” (GGC 2015, p. 42).</i></li> <li>– <i>“A major part of executive directors’ variable remuneration should be linked to the award of shares or financial instruments whose value is linked to the share price” (GGC 2015, p. 44).</i></li> <li>– <i>“Following the award of shares, share options or other rights on shares derived from the remuneration system, directors should not be allowed to transfer a number of shares equivalent to twice their annual fixed remuneration, or to exercise the share options or other rights on shares for at least three years after their award” (GGC 2015, p. 44).</i></li> <li>– <i>“Companies should disclose [...] shares held [by each Director] in the company, and any options on the same” (GGC 2015, p. 25).</i></li> </ul>

Source: Good Governance Codes published by the CNMV

The previous regulation and Good Governance Codes determine the available information about executive compensation. This information is published in the CNMV’s webpage.



## Appendix V. Examples of Processing and Tabulating IARC's Information

Following, I present several examples of information included in IARC's body and how it was codified for the analysis:

- i. Abertis IARC's summary table shows a zero short-term bonus amount in 2014. However, the body of 2014 Abertis IARC (p. 8) mentions that "*the CEO short-term bonus was 995 thousand euros in 2014*"<sup>98</sup> and that "*the short-term bonus amount was paid as an additional contribution to the CEO's pension plan*"<sup>99</sup>.

Consequently, I considered that the 2014 short-term bonus of Abertis' CEO was 995 thousand euros as reflected in the body of the IARC, instead of zero euros as reflected in the IARC's summary table.

- ii. Melia IARC's summary table shows a 412 thousand euros short-term bonus in 2017. However, the body of 2017 Melia IARC (p. 19) refers to the "*short-term bonus of 2016 that was paid in 2017*"<sup>100</sup> and it adds that this short-term bonus "*represented 116% of target short-term bonus compensation*"<sup>101</sup>. In addition, I verified that 116% of 2016 target short-term bonus compensation corresponds to

---

<sup>98</sup> Free translation from Spanish.

<sup>99</sup> Free translation from Spanish.

<sup>100</sup> Free translation from Spanish.

<sup>101</sup> Free translation from Spanish.

the amount included in 2017 IARC's summary tables. Consequently, I reclassified the short-term bonus included in 2017 Melia IARC's summary table as the short-term bonus accrued in 2016.

- iii. Caixabank IARC's summary table shows a 260 thousand euros short-term bonus and 260 thousand euros share-based compensation in 2017. However, the body of 2017 Caixabank IARC (p. 12) mentions that the CEO "*short-term bonus amounts 520 thousand euros*"<sup>102</sup> and that it is paid "*50% in cash and 50% in shares*"<sup>103</sup>.

Consequently, I reclassified the amount included as share-based compensation in 2017 Caixabank IARC's summary table as short-term bonus. As a result, I considered that the 2017 short-term bonus of Caixabank's CEO was 520 thousand euros as reflected in the body of the IARC, instead of 260 euros as reflected in the IARC's summary table.

Also, I considered that the 2017 share-based compensation of Caixabank's CEO was zero euros instead of 260 thousand euros as reflected in the IARC's summary table.

As shown in the previous examples, the information included in the body of the IARCs enriches and/or corrects in several aspects the information included in the summary tables of the IARCs. The consideration of this information does not require to interpret it

---

<sup>102</sup> Free translation from Spanish.

<sup>103</sup> Free translation from Spanish.

subjectively because there is enough objective data to correctly amend the summary tables.



## References

- Acharya, V. V., Kose, J., & Sundaram, R. K. (2000). On the optimality of resetting executive stock options. *Journal of Financial Economics*, 57(1), 65–101.
- Agrawal, A., & Mandelker, G. N. (1987). Managerial incentives and corporate investment and financing decisions. *The Journal of Finance*, 42(4), 823–837.
- Baixauli-Soler, J. S., & Sanchez-Marin, G. (2011). Organizational governance and TMT pay level adjustment. *Journal of Business Research*, 64(8), 862–862.
- Baixauli-Soler, J. S., & Sanchez-Marin, G. (2015). Executive compensation and corporate governance in Spanish listed firms: a principal–principal perspective. *Review of Managerial Science*, 9(1), 115-140.
- Bebchuk, L., Fried, J. M., & Walker, D. I. (2002). Managerial Power and Rent Extraction in the Design of Executive Compensation. *University of Chicago Law Review*, 69, 751–846.
- Bebchuk, L. A., & Fried, J. M. (2003). Executive compensation as an agency problem. *The Journal of Economic Perspectives*, 17(3), 71–92.
- Bebchuk, L. A., & Fried, J. M. (2006). Pay without performance: Overview of the issues. *Academy of Management Perspectives*, 20(1), 5-24.

- Berle, A. A., Means, G. C., & Columbia University. Council for Research in the Social Sciences. (1932). *Modern corporation and private property*. Commerce Clearing House, Loose leaf Service division of the Corporation Trust Company.
- Bettis, J. C., Bizjak, J. M., & Lemmon, M. L. (2005). Exercise behavior, valuation, and the incentive effects of employee stock options. *Journal of Financial Economics*, 76(2), 445–470.
- Black, F., & Scholes, M. (1973). The pricing of options and corporate liabilities. *The Journal of Political Economy*, 81(3), 637–637.
- Bliss, R. T., & Rosen, R. J. (2001). CEO compensation and bank mergers. *Journal of Financial Economics*, 61(1), 107-138.
- Bonet, R., Cappelli, P., & Hamori, M. (2020). Gender differences in speed of advancement: an empirical examination of top executives in the fortune 100 firms. *Strategic Management Journal*, 41(4), 708–737.
- Boyd, B. K., Franco Santos, M., & Shen, W. (2012). International developments in executive compensation. *Corporate Governance: An International Review*, 20(6), 511–518.
- Broadie, M., & Detemple, J. B. (2004). Anniversary article: Option pricing: Valuation models and applications. *Management Science*, 50(9), 1145-1177.

- Cantino, V., Devalle, A., & Fiandrino, S. (2017). ESG sustainability and financial capital structure: Where they stand nowadays.
- Carpenter, J. N. (1998). The exercise and valuation of executive stock options. *Journal of Financial Economics*, 48(2), 127–158.
- Cavaco, S., Crifo, P., & Guidoux, A. (2020). Corporate social responsibility and governance: the role of executive compensation. *Industrial Relations*, 59(2), 240–274.
- Chance, D. M., & Yang, T.-H. (2007). Black-Scholes-Merton, liquidity, and the valuation of executive stock options. *Issues in Corporate Governance and Finance*, 12, 271–310.
- Chava, S., & Purnanandam, A. (2010). CEOs versus CFOs: incentives and corporate policies. *Journal of Financial Economics*, 97(2), 263–263.
- Chen, M. A. (2004). Executive option repricing, incentives, and retention. *The Journal of Finance*, 59(3), 1167–1199.
- Coles, J. L., & Daniel, N. D. (2006). Managerial incentives and risk-taking. *Journal of Financial Economics*, 79(2), 431–468.
- Conyon, M. J., & Schwalbach, J. (2000). Executive compensation: Evidence from the UK and Germany. *Long Range Planning*, 33(4), 504-526.

- Core, J., & Guay, W. (1999). The use of equity grants to manage optimal equity incentive levels. *Journal of Accounting & Economics*, 28(2), 151–184.
- Core, J., & Guay, W. (2002). Estimating the value of employee stock option portfolios and their sensitivities to price and volatility. *Journal of Accounting Research*, 40(3), 613–630.
- Cox, J. C., Ross, S. A., & Rubinstein, M. (1979). Option pricing: a simplified approach. *Journal of Financial Economics*, 7(3), 229–229.
- DeFusco, R. A., Johnson, R. R., & Zorn, T. S. (1990). The effect of executive stock option plans on stockholders and bondholders. *The Journal of Finance*, 45(2), 617–627.
- Demsetz, H., & Lehn, K. (1985). The structure of corporate ownership: causes and consequences. *The Journal of Political Economy*, 93(6), 1155–1155.
- Devalle, A., Fiandrino, S., & Cantino, V. (2017). The linkage between ESG performance and credit ratings: a firm-level perspective analysis.
- Di Persio, L., Prezioso, L., & Wallbaum, K. (2019). Closed-end formula for options linked to target volatility strategies. Working Paper.
- Dorff, M. B. (2005). Does one hand wash the other? testing the managerial power and optimal contracting theories of executive compensation. *Journal of Corporation Law*, 30(2), 255–307.

- Duran Herrera, J. J., & Gallardo Olmedo, F. (2013). *Finanzas internacionales para la empresa* (Serie Colección "Economía y empresa"). Ediciones Pirámide.
- Edmans, A., Gabaix, X., & Jenter, D. (2017). Executive compensation: a survey of theory and evidence. Working Paper Series, 23596.
- Eisenhardt, K. M. (1989). Agency theory: an assessment and review. *The Academy of Management Review*, 14(1), 57–74.
- Fama, E. F. (1980). Agency problems and the theory of the firm. *Journal of Political Economy*, 88(2), 288–307.
- Fama, E. F., & Jensen, M. C. (1983). Agency problems and residual claims. *Journal of Law and Economics*, 26(2), 327–327.
- Feriozzi, F. (2011). Paying for observable luck. *The Rand Journal of Economics*, 42(2), 387–415.
- Ferrer Zubieta, E., López Arceiz, F. J., & Río Solano, M. C. D. (2020). Sustainability disclosure and financial analysts' accuracy: the European case. *Business Strategy and the Environment*, 2020, 29 (8), 2939-2952.
- Firth, M., Fung, P. M., & Rui, O. M. (2006). Corporate performance and CEO compensation in China. *Journal of Corporate Finance*, 12(4), 693-714.

- Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233.
- Frydman, C., & Jenter, D. (2010). CEO compensation. *Annual Review of Financial Economics*, 2, 75–102.
- Frydman, C., & Saks, R. E. (2010). Executive compensation: a new view from a long-term perspective, 1936-2005. *The Review of Financial Studies*, 23(5), 2099–2138.
- Fuchs, R. M., & Sato, S. S. (2009). El sueldo no es suficiente para atraer y retener a los mejores. *Journal of Business*, 1(2), 91-106.
- Galbreath, J. (2013). ESG in focus: The Australian evidence. *Journal of business ethics*, 118(3), 529-541.
- Gallardo, F., & Villacorta, F. S. (2016). La posición en los mercados internacionales de las grandes empresas multinacionales españolas. *Papeles de Economía Española*, (150), 20.
- Geiler, P. H. M., & Renneboog, L. D. R. (2011). Managerial compensation: agency solution or problem? *Journal of Corporate Law Studies*, 11(1), 99–138.
- Gete, P., & Gomez, J.-P. (2017). Executive compensation and firm leverage. a policy oriented survey. *SSRN Electronic Journal*.

- Gomez, J.P. (2019). Remuneration and incentives for executive directors in the Ibx 35 companies between 2013 and 2017. *CNMV Quarterly Bulletin* (1), 120-154.
- Gormley, T. A., Matsa, D. A., & Milbourn, T. (2013). CEO compensation and corporate risk: evidence from a natural experiment. *Journal of Accounting & Economics*, 56(2-3), 79–79.
- Grant, J., Markarian, G., & Parbonetti, A. (2009). CEO risk-related incentives and income smoothing. *Contemporary Accounting Research*, 26(4), 1029–1065.
- Guay, W. R., Kepler, J. D., & Tsui, D. (2019). The role of executive cash bonuses in providing individual and team incentives. *Journal of Financial Economics*, 133(2), 441–441.
- Hall, B. J., & Liebman, J. B. (1998). Are CEOs really paid like bureaucrats? *The Quarterly Journal of Economics*, 113(3), 653–691.
- Hall, B., & Murphy, K. (2002). Stock options for undiversified executives. *Journal of Accounting & Economics*, 33(1), 3–42.
- Hayes, R. M., Lemmon, M., & Qiu, M. (2012). Stock options and managerial incentives for risk taking: evidence from FAS 123r. *Journal of Financial Economics*, 105(1), 174–174.

- Hemmer, T., Matsunaga, S., & Shevlin, T. (1996). The influence of risk diversification on the early exercise of employee stock options by executive officers. *Journal of Accounting & Economics*, 21(1), 45–45.
- Hill, C. W. L., & Jones, T. M. (1992). Stakeholder-agency theory. *The Journal of Management Studies*, 29(2), 131–131.
- Holthausen, R. W., Larcker, D. F., & Sloan, R. G. (1995). Annual bonus schemes and the manipulation of earnings. *Journal of accounting and economics*, 19(1), 29-74.
- Huddart, S. (1994). Employee stock options. *Journal of Accounting & Economics*, 18(2), 207–207.
- Huddart, S., & Lang, M. (1996). Employee stock option exercises: an empirical analysis. *Journal of Accounting & Economics*, 21(1), 5–5.
- Hull, J., & White, A. (2004). How to value employee stock options. *Financial Analysts Journal*, 60(1), 114–119.
- Hull, J. C. (2015). *Options, futures, and other derivatives* (9th ed.). Pearson.
- Inderst, G., & Stewart, F. (2018). Incorporating environmental, social and governance (ESG) factors into fixed income investment. World Bank Group publication, April.

Jensen, M. C. (1991). Eclipse of the public corporation. *McKinsey Quarterly*, 1(1), 117-144.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3, 305–360.

Jensen, M. C., & Murphy, K. J. (1990). Performance pay and top-management incentives. *The Journal of Political Economy*, 98(2), 225–225.

Jha, A., & Cox, J. (2015). Corporate social responsibility and social capital. *Journal of Banking & Finance*, 60, 252-270.

Kato, T., & Kubo, K. (2006). CEO compensation and firm performance in Japan: Evidence from new panel data on individual CEO pay. *Journal of the Japanese and International Economies*, 20(1), 1-19.

Kazan, E. (2016). The impact of CEO compensation on firm performance in Scandinavia (Bachelor's thesis, University of Twente).

Khan, M. (2019). Corporate governance, ESG, and stock returns around the world. *Financial Analysts Journal*, 75(4), 103-123.

- Lambert, R. A., Larcker, D. F., & Verrecchia, R. E. (1991). Portfolio considerations in valuing executive compensation. *Journal of Accounting Research*, 29(1), 129–149.
- MacMinn, R. D., & Page, F. H. (2006). Stock options and capital structure. *Annals of Finance*, 2(1), 39–50.
- Malmendier, U., & Tate, G. (2005). CEO overconfidence and corporate investment. *The Journal of Finance*, 60(6), 2661–2700.
- Maranho, F. S., & Leal, R. (2018). Corporate governance and firm performance in Latin America: a meta-analysis. *Academia Revista Latinoamericana de Administración*.
- Markarian, G., Parbonetti, A., & Previts, G. J. (2007). The convergence of disclosure and governance practices in the world's largest firms. *Corporate Governance: An International Review*, 15(2), 294–294.
- Melis, A., & Rombi, L. (2018). Are optimal contracting and managerial power competing or complementary views? evidence from the compensation of statutory auditors in Italy. *Corporate Governance: An International Review*, 26(3), 197–218.
- Mitsudome, T., Weintrop, J., & Hwang, L. S. (2008). The relation between changes in CEO compensation and firm performance: A Japanese/American comparison. *Journal of the Japanese and International Economies*, 22(4), 605-619.

- Monjas, M. & Balibrea, J. (2014). A valuation of wind power projects in Germany using real regulatory options. *Energy* 77, 422-433.
- Murphy, K. J. (2002). Explaining executive compensation: managerial power versus the perceived cost of stock options. *The University of Chicago Law Review*, 69(3), 847–869.
- Murphy, K. J. (2013). Executive compensation: Where we are, and how we got there. In *Handbook of the Economics of Finance* (Vol. 2, pp. 211-356). Elsevier.
- Murphy, K. J., & Zabochnik, J. (2004). CEO pay and appointments: a market-based explanation for recent trends. *The American Economic Review*, 94(2), 192–196.
- Ozkan, N. (2011). CEO compensation and firm performance: An empirical investigation of UK panel data. *European Financial Management*, 17(2), 260-285.
- Palia, D. (2001). The endogeneity of managerial compensation in firm valuation: A solution. *The Review of financial studies*, 14(3), 735-764.
- Panda, B., & Leepsa, N. M. (2017). Agency theory: review of theory and evidence on problems and perspectives. *Indian Journal of Corporate Governance*, 10(1), 74–95.

- Payne, G. T., & Petrenko, O. V. (2019). Oxford research encyclopedia of business and management. In Agency theory in business and management research. essay, Oxford University Press.
- Randoy, T., & Nielsen, J. (2002). Company performance, corporate governance, and CEO compensation in Norway and Sweden. *Journal of Management and Governance*, 6(1), 57-81.
- Richardson, B. J. (2009). Keeping ethical investment ethical: Regulatory issues for investing for sustainability. *Journal of Business Ethics*, 87(4), 555-572.
- Ross, S. A. (1973). The economic theory of agency: the principal's problem. *The American Economic Review*, 63(2), 134–139.
- Saadi, V. (2020). Role of the community reinvestment act in mortgage supply and the US housing boom. *The Review of Financial Studies*, 33(11), 5288-5332.
- Sanders, W. G., & Hambrick, D. C. (2007). Swinging for the fences: the effects of CEO stock options on company risk taking and performance. *Academy of Management Journal*, 50(5), 1055–1078.
- Shapiro, S. P. (2005). Agency theory. *Annual Review of Sociology*, 31, 263–284.

- Sahut, J. M., & Pasquini-Descomps, H. (2015). ESG impact on market performance of firms: International Evidence. *Management International/International Management/Gestion Internacional*, 19(2), 40-63.
- Smirnova, A. S., & Zavertiaeva, M. A. (2017). Which came first, CEO compensation or firm performance? The causality dilemma in European companies. *Research in International Business and Finance*, 42, 658-673.
- Smith, A. (1796). *An inquiry into the nature and causes of the wealth of nations: in three volumes* (8th ed., Ser. Ecco). Printed for A. Strahan, T. Cadell and W. Davies.
- Sole, A. (2013). Sistemas de retribución variable: ventajas e inconvenientes. *Revista de contabilidad y direccion*, 17(1), 11-27.
- Taneja, H. C., Batra, L., & Gaur, P. (2019, December). Entropy as a measure of implied volatility in options market. In *AIP Conference Proceedings* (Vol. 2183, No. 1, p. 110005). AIP Publishing LLC.
- Tian, Y. S. (2001). Optimal contracting, incentive effects and the valuation of executive stock options. *SSRN Electronic Journal*, (2001).
- Yalincak, O. H. (2012). Criticism of the Black-Scholes Model: But Why is It Still Used?:(The Answer is Simpler than the Formula). Working Paper.

Yermack, D. (1995). Do corporations award CEO stock options effectively? *Journal of Financial Economics*, 39(2,3), 237–237.

Yoon, B., Lee, J. H., & Byun, R. (2018). Does ESG performance enhance firm value? Evidence from Korea. *Sustainability*, 10(10), 3635.