

Women with STEM qualifications on supervisory boards. Does a high women quota in supervisory boards influence firm success?

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ABSTRACT

Many large companies in Europe include mainly men in supervisory boards and the women quota is often lower than 20 %. In Germany an optional women quota of 30 % in supervisory boards was proposed for capital market oriented companies in 2016. Some assume that without a gender quota the earnings of enterprises would shrink as male and female members in supervisory teams do not work in such a harmonized and structured way. Others think that a women quota in supervisory boards should be requested by law and should not remain optional. In this context, conducting research and analyzing the impact of the women's presence in supervisory boards on the success of companies appear as a necessary topic. The present article looks at the companies of EURO STOXX 50 in the year 2015 and their success and tries to establish whether this success can be related to the percentage of female members in supervisory positions. It replicates in this way the study of Binder, Alonso-Almeida and Bremser (2016) which analyzed the relationship between female's representation in the management board (executive board) and firm performance (measured by earnings before taxes - EBT) of the EURO STOXX 50 companies in 2014. It is in the same time an extension of the original study as the supervisory board is brought under scrutiny and a closer look at women qualifications, and especially women with STEM qualifications is provided.

KEYWORDS

EURO STOXX 50, STEM qualifications, Key performance indicators, Firm performance.

1. Introduction

Many large companies in Europe include mainly men in supervisory boards and the women quota is often lower than 20 %. In Germany an optional women quota of 30 % in supervisory boards was proposed for capital market oriented companies in 2016. The present article looks at the companies of EURO STOXX 50 in the year 2015 and their success and tries to establish whether this success can be related to the percentage of female members in supervisory positions. It replicates in this way the study of Binder *et al.* (2016) which analyzed the relationship between female's representation in the management board (executive board) and firm performance (measured by earnings before taxes - EBT) of the EURO STOXX 50 companies in 2014. It is in the same time an extension of the original study as the supervisory board is brought under scrutiny and more details about the number of women in supervisory boards, the STEM qualifications of women (STEM stands for science, technology, engineering, and mathematics), the women quotas and the reasons behind are examined.

This article contributes to the literature in the field of Key Performance Indicators (KPIs) as success factors e.g. the EBT. It offers an insight into the relationship between the economic success of 50 European companies and the gender balance on supervisory boards. A special focus lies on women with STEM qualifications in supervisory boards to show if this situation is satisfying or whether it can be improved. For this purpose the article builds upon existing literature in the field of KPIs, diversity management, supervisory boards, and women quota, etc. The paper is structured as follows: the next section presents the literature review and introduces the hypothesis. Section three contains the research methodology. In section four the findings are discussed. Finally, section five develops insights for investors and owners and shows the limitations of the study and offers suggestions for future lines of research.

2. Literature Review

A controversial issue during the past decades was women's presence in supervisory boards. The underrepresentation of women in decision-making position is a known problem in the business world and if an implementation of ethical principles might be difficult, "by passing the legal regulations it is possible to set the rules of behaviour" (Grbac and Lončarić, 2009: 145), in this case by imposing a gender quota for corporate

boards. This paper argues that images such as the “white, heterosexual, western, middle/upper class, able man” (Zanoni *et al.*, 2010: 13) ought to be challenged in international business and it considers that companies which avoid appointing women in top position are “unaware of new sources of value, and consequently, are sub-optimizing both the economic value of the firm and value to society” (Mohammed, 2014: 243). Nevertheless, women are still the exception in German supervisory boards, even though their representation increased gradually (Holst and Kirsch, 2014). In Northern Europe more women are present in supervisory boards (e.g. Norway, Iceland, Latvia, Finland and Sweden to mention the top 5 countries with the highest women quota). It depends on the examined countries if a study can find a significant link between firm performance and the women quota in supervisory boards. On the one hand, it was shown e.g. for Denmark that a higher women quota in supervisory boards can determine a better company performance (Lückerath-Rovers, 2011) but on the other hand, this finding could not be verified for the same country by other studies (Rose, 2007).

Beaufort and Summers (2013) identified at European level a 1.5% change of women representation in mainly male supervisory boards between 2009 and 2013. If women were already member in a supervisory board, the women quota was likely to increase further. When one woman was a board member, the women quota stood at 3.2%; by already 3 women in the supervisory board, the women quota increased to 3.7%. According to the above study the average women quota in supervisory boards in Europe in 2013 was 7.9%. France stood out as a positive example with a women quota of 28.1% in 2013.

Another study on women in European listed companies suggests positive effects of diverse boards on corporate governance and even on firm performance (Buchwald and Hottenrott, 2014). A similar result was registered by a Catalyst study which examines the relationship between women on corporate boards and their companies’ financial performance in the United States (Catalyst, 2007). The study “Women matter. Gender diversity, a corporate performance driver” shows that companies with a higher proportion of women in top management perform better (McKinsey, 2007). Other authors signal rather the lack of evidence that female representation in supervisory boards improves profitability (Ferreira, 2014). It is suggested that rather benefits for the society should be measured when women occupy supervisory board positions. In a study with 108 German large corporations which

took place between 2009 and 2013, there was not enough evidence to indicate a significant relationship between gender diversity and firms' financial performance (Dick, 2015).

There are however, institutional factors driving gender quotas in supervisory boards such as e.g. welfare provision for state-owned enterprises, political coalitions and a legacy of initiatives (Terjesen *et al.*, 2015). It is more likely to establish a high gender quota in supervisory board with left-leaning governments. In a survey of 201 Norwegian firms the positive effect of the women quota in supervisory boards is seen in increased board development activities and in a decreased level of conflict (Nielsen, 2010). Another exhaustive study, in which 2.360 companies from the Morgan Stanley Capital International All Country World Index (MSCI ACWI) were observed over a period of 6 years by the Credit Suisse Research Institute (2012) shows as a result a better mix of leadership skills, a wider pool of talent and a better risk aversion, the higher the women quota in supervisory boards in the companies is (Kersley and O'Sullivan, 2012). Many studies (e.g. Bilimoria, 2006, Terjesen *et al.*, 2009) suggest also a positive relationship between female supervisory board members and the number of women officers in management.

What needs to be acknowledged is the fact that gender balance became a priority and diversifying corporate supervisory boards often represent a target to be achieved. Small improvements can be seen with a law instituted quota for women in supervisory boards (Corkery and Taylor, 2012). In Norway, Italy, France, Spain and starting with 2016 also in Germany binding gender quota exist (Sullivan, 2015). Norway was the first country to legislate board quotas in 2004 and many countries followed with law determined or optional women quotas in supervisory boards, however, less than 10 % of the board members consist of women (Dizik, 2015). Moreover, men in supervisory boards have often better networks and for this reason the male supervisory board managers often recruit male followers which minimizes the women quota in supervisory boards on the long run (Terjesen *et al.*, 2015). Rosa *et al.*, (1996) analysed the impact of gender on small business performance in the United Kingdom (UK) and concluded that there are "some considerable differences by sex in quantitative economic and financial performance measures" (p. 476). Kalleberg and Leicht (1991) examined organizational performance in terms of survival and success and according to the results of their study, companies that

have a high women quota in supervisory boards are not more likely to go bankrupt than those with a high male quota, because both men and women are equally successful with regard to earnings growth.

Another study with reversed causality shows that in over 3,876 public companies the presence of independent female directors is necessary in supervisory boards to contribute best to the firms' performance (Terjesen *et al.*, 2015). This means that, when no women are included as supervisory board members, the companies' results are lower (measured by Tobin's Q and shown by the Return on assets ROA). Finally, another study with reversed causality about 151 of the capital market listed German firms shows that only after a critical mass of about 30% (e.g. 3 women in absolute positions) is attained, then a higher firm performance can be reached (Joecks *et al.*, 2012).

The present research focuses on the companies of the EURO STOXX 50 index, and aims at exploring whether there is a link between the EBT of these successful European companies and the number of women in supervisory boards. Britzelmaier *et al.*, (2013) focused on the same index while examining the remuneration of management in 2009, during the financial crisis. It has to be noted that the relationship between the EBT and the women quota in management boards was analysed thoroughly by Binder *et al.*, (2016), however, the focus of this article lies on the supervisory board and especially on the link between firms' performance measured by EBT and the proportion of women on the supervisory boards with a STEM-educational background. The following hypothesis is formulated and will be tackled in the following sections:

H1: Enterprises which have a higher gender quota in supervisory boards are more successful and achieve a higher EBT.

3. Methodology

The EURO STOXX 50 Index was selected to represent the performance of the 50 largest companies among 19 supersectors in the year 2015. There are enterprises of seven Eurozone countries which are integrated in this index. This index has a fixed number of components and is part of the STOXX blue-chip index family. The current study looks at the number of women in supervisory boards and lists their names as presented in the 2015 annual reports (see table 1). The data regarding the EBT of each of the fifty companies

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was collected via financial websites. It should be taken into account that women in supervisory boards listed below are sometimes member in more than just one supervisory board.

No.	Company name	Country	women quota in supervisory board	STEAM women quota in supervisory board	Name of women on board
1	Air Liquide	FR	41,7%	16,7%	Geneviève Berger, Sin-Leng Low, Siân Herbert-Jones, Annette Winkler, Karen Katen
2	AIRBUS GROUP SE	FR	16,7%	8,3%	Anne Lauvergeon, María Amparo Moraleda Martínez
3	ALLIANZ	DE	30,8%	0,0%	Christine Bosse, Gabriele Burkhardt-Berg, Ira Gloe-Semler, Renate Köcher
4	ANHEUSER-BUSCH INBEV	BE	14,3%	0,0%	Maria Asuncion Aramburuzabala, Michele Burns
5	ASML HLDG	NL	33,3%	0,0%	Pauline F.M. van der Meer Mohr, Clara (Carla) M.S. Smits-Nusteling
6	ASSICURAZIONI GENERALI	IT	40,0%	0,0%	Alberta Figari, Ornella Barra, Sabrina Pucci, Paola Sapienza
7	AXA	FR	35,7%	7,1%	Isabelle Kocher, Suet Fern Lee, Deanna Oppenheimer, Doina Pallici-Chehab, Dominique Reiniche
8	BASF	DE	25,0%	8,3%	Dame Alison Carnwath, Anke Schäferkordt, Denise Schellemans
9	BAYER	DE	20,0%	10,0%	Simone Bagel-Trah, Petra Kronen, Sue H. Rataj, Petra Reinbold-Knape
10	BCO BILBAO VIZCAYA ARGENTARIA	ES	25,0%	8,3%	Belén Garijo López, Lourdes Máiz Carro, Susana Rodríguez Vidarte
11	BCO SANTANDER	ES	36,4%	0,0%	SoI Daurella Comadrán, Esther Giménez-Salinas i Colomer, Belén Romana García, Isabel Tocino Biscarolasaga
12	BMW	DE	30,0%	0,0%	Christiane Benner, Susanne Klatten, Renate Köcher, Simone Menne, Dominique Mohabeer, Brigitte Rödig
13	BNP PARIBAS	FR	50,0%	14,3%	Monique Cohen, Marion Guillou, Nicole Misson, Laurence Parisot, Daniela Schwarzer, Sandrine Verrier, Fields Wicker-Miurin
14	CARREFOUR	FR	25,0%	0,0%	Diane Labryère-Cuilleret, Mathilde Lemoine, Patricia Lemoine, Anne-Claire Taittinger
15	DAIMLER	DE	25,0%	5,0%	Sari Baldauf, Petraea Heynike, Andrea Jung, Elke Tönjes-Werner, Sabine Maaßen
16	DANONE	FR	38,5%	7,7%	Marie-Anne Jourdain, Gaëlle Olivier, Isabelle Seillier, Mouna Sepehri, Bettina Theissig
17	DEUTSCHE BANK	DE	31,8%	9,1%	Dina Dublon, Katherine Garrett-Cox, Sabine Irrgang, Martina Klee, Henriette Mark, Louise M. Parent, Gabriele Platscher
18	DEUTSCHE POST	DE	35,0%	5,0%	Simone Menne, Katja Windt, Andrea Kocsis, Anke Kufalt, Sabine Schielmann, Helga Thiel, Stefanie Weckesser
19	DEUTSCHE TELEKOM	DE	40,0%	10,0%	Sari Baldauf, Monika Brandl, Nicole Koch, Petra Steffi Kreusel, Sylvia Hauke, Sibylle Poon, Ines Kolmsee, Waltraud Litzenberger
20	E.ON	DE	16,7%	0,0%	Denise Kingsmill, Karen de Segundo
21	ENEL	IT	33,3%	0,0%	Giulia De Martino, Lidia D'Alessio
22	ENGIE	FR	57,9%	10,5%	Isabelle Kocher, Ann-Kristin Achleitner, Françoise Malrieu, Marie-José Nadeau, Barbara Kux, Stéphane Pallez, Mari-Noëlle Jégo-Laveissière, Caroline Simon, Lucie Muniesa, Catherine Guillooard, Anne-Marie Mourer
23	ENI	IT	20,0%	0,0%	Karina A. Litvack
24	ESSILOR INTERNATIONAL	FR	18,8%	6,3%	Maureen Cavanagh, Juliette Favre, Louise Fréchette
25	FRESENIUS	DE	0,0%	0,0%	
26	GRP SOCIETE GENERALE	FR	50,0%	14,3%	Barbara Dalibard, Kyra Hazou, Ana Maria Llopis Rivas, Nathalie Rachou , Alexandra Schaapveld, France Houssaye, Béatrice Lepagnol
27	IBERDROLA	ES	38,5%	0,0%	Inés Macho Stadler, Samantha Barber, María Helena Antolin Raybaud, Georgina Kessel Martinez, Denise Mary Holt
28	Industria de Diseño Textil S.A.	ES	25,0%	12,5%	Flora Pérez Marcote, Irene R. Miller
29	ING GRP	NL	25,0%	0,0%	Isabel Martín Castellá, Mariana Gheorghe
30	INTESA SANPAOLO	IT	26,3%	0,0%	Rosalba Casiraghi, Rossella Locatelli, Beatrice Ramasco, Marcella Sarale, Monica Schiraldi,
31	L'OREAL	FR	40,0%	13,3%	Ana Sofia Amaral, Belén Garijo, Françoise Bettencourt Meyers, Sophie Bellon, Virginie Morgon, Christiane Kuehne
32	LVMH MOET HENNESSY	FR	23,5%	0,0%	Delphine Arnault, Bernadette Chirac, Marie-Laure Sauty de Chalons, Marie-Josée Kravis
33	MUENCHENER RUECK	DE	40,0%	5,0%	Ann-Kristin Achleitner, Benita Ferrero-Waldner, Ursula Gather, Anne Horstmann, Ina Hosenfelder, Beate Mensch, Gabriele Sinz-Toporzyssek, Angelika Wirtz
34	NOKIA	FI	25,0%	12,5%	Elizabeth Nelson, Elizabeth Doherty
35	ORANGE	FR	40,0%	6,7%	Helle Kristoffersen, Mouna Sepehri, Anne Lange, Ghislaine Coinaud, Lucie Muniesa, Claudie Haigneré
36	PHILIPS	NL	33,3%	0,0%	Neelam Dhawan, Orit Gadish, Christine Poon
37	SAFRAN	FR	23,5%	11,8%	Monique Cohen, Odile Desforges, Élisabeth Lulin, Astrid Milsan
38	SAINT GOBAIN	FR	40,0%	13,3%	Isabelle Bouillot, Anne-Marie Idrac, Sylvia Jay, Pamela Knapp, Agnès Lemarchand, Olivia Qiu
39	SANOFI	FR	35,7%	21,4%	Bonnie Bassler, Claudie Haigneré, Fabienne Lecorvaisier, Suet-Fern Lee, Carole Piwnica
40	SAP	DE	22,0%	16,5%	Margret Klein-Magar, Anja Feldmann, Gesche Joost, Christine Regitz
41	SCHNEIDER ELECTRIC	FR	38,5%	7,7%	Betsy Atkins, Magali Herbaut, Linda Knoll, Cathy Kopp, Lone Fønss Schröder,
42	SIEMENS	DE	30,0%	5,0%	Birgit Steinborn, Bettina Haller, Nicola Leibinger-Kammüller, Güler Sabancı, Nathalie von Siemens, Sibylle Wankel
43	TELEFONICA	ES	11,0%	0,0%	Eva Castillo Sanz , Sabina Fluxà Thienemann
44	TOTAL	FR	33,3%	0,0%	Patricia Barbizet, Marie-Christine Coisne-Roquette, Anne-Marie Idrac, Barbara Kux
45	UNIBAIL-RODAMCO	FR	36,4%	0,0%	Mary Harris, Jacqueline Tammenoms Bakker, Dagmar Kollmann, Sophie Stabile
46	UNICREDIT	IT	20,0%	0,0%	Maria Enrica Spinardi
47	UNILEVER NV	NL	54,6%	0,0%	Laura Cha , Ann Fudge, Louise Fresco, Judith Hartmann, Mary Ma, Hixonia Nyasulu
48	VINCI	FR	40,0%	20,0%	Graziella Gavezotti, Marie-Christine Lombard, Josiane Marquez, Ana Paula Pessoa, Pascale Sourisse, Yannick Assouad
49	VIVENDI	FR	42,9%	0,0%	Nathalie Bricault, Yseulys Costes, Aliza Jabès, Cathia Lawson-Hall, Virginie Morgon, Katie Stanton
50	VOLKSWAGEN PREF	DE	15,0%	0,0%	Annika Falkengren, Babette Fröhlich, Louise Kiesling

Source: own representation based on the information from: <https://www.stoxx.com/index-details?symbol= SX5E>, retrieval date: 03/03/2017.

Table 1. Overview of the 50 EURO STOXX companies in 2015, of their women quota and STEAM women quota

EURO STOXX 50 index is one of the most liquid indices for the Eurozone and serves for benchmarking purposes. The index is a financial control index which ensures stable and up-to-date figures. It represents the performance of only the largest and most liquid companies in a sector (STOXX Limited, 2016).

The present research focuses on the interrelationship between company success and women on supervisory boards on basis of the EURO STOXX 50 index. Therefore, the aforementioned hypothesis will be tackled in the following sections. The interrelationship between company success and women on supervisory boards is modeled in a univariate single-equation model. Women on supervisory boards represent the independent variable, company success represents the dependent variable. The independent variable is defined as the numerical ratio of the number of women in supervisory board compared to the number of total supervisory board members. The hypothesis is tested using the numerical dependent variable EBT, as a measure for companies' success.

The composition of EURO STOXX index in 2015 changed slightly in comparison to the year before. Two new companies were included in the EURO STOXX index: Fresenius (Germany) and Safran (France) replaced Repsol (Spain) and REWE (Germany), a change which became effective on September 2015 (STOXX Limited, 2015). The composition change of the index takes place once a year, in September, when only the biggest companies are maintained on the basis of their market capitalization and their price index. Out of the 50 EURO STOXX companies four have e.g. the highest index weights: Total (France) with 4.78%, Sanofi-Aventis (France) with 4.39 %, Bayer (Germany) with 4.29 %, and Anheuser-Busch InBev (Belgium) with 4.11 %. In order to examine how successful these companies are, the EBT was chosen as being a relevant KPI, taking thus into consideration the fact that companies may face different tax rates in different states. In other words, the lack of a harmonized taxation system across the Eurozone will not affect the results of this study, the EBT making possible a comparison of the 50 EURO STOXX companies at European level (see table 2).

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Company's name	Sector	Country	ISIN	No. of Women	Percentage of Women on the Board	Earnings before Taxes (in Mio. EUR)	EBT/Total no. Of Employees (in thousands)
Air Liquide	Chemicals	FR	FR0000120073	5	41,67%	2.490,40	49,81
AIRBUS GROUP SE	Industrial Goods & Services	FR	NL0000235190	2	16,67%	2.359,00	17,27
ALLIANZ	Insurance	DE	DE0008404005	4	30,77%	9.763,00	68,53
ANHEUSER-BUSCH INBEV	Food & Beverage	BE	BE0974293251	2	14,29%	11.482,33	76,55
ASML HLDG	Technology	NL	NL0010273215	3	33,33%	1.856,08	126,43
ASSICURAZIONI GENERALI	Insurance	IT	IT0000062072	4	40,00%	3.293,00	47,04
AXA	Insurance	FR	FR0000120628	5	35,71%	7.521,00	76,53
BASF	Chemicals	DE	DE000BASF111	3	25,00%	5.297,00	47,11
BAYER	Chemicals	DE	DE000BAY0017	4	20,00%	5.254,00	44,98
BCO BILBAO VIZCAYA ARGENTARIA	Banks	ES	ES0113211835	3	25,00%	4.428,00	32,09
BCO SANTANDER	Banks	ES	ES0113900137	4	36,36%	9.172,00	47,31
BMW	Automobiles & Parts	DE	DE0005190003	6	30,00%	8.706,00	71,22
BNP PARIBAS	Banks	FR	FR0000131104	7	50,00%	9.790,00	51,78
CARREFOUR	Retail	FR	FR0000120172	4	25,00%	1.673,00	4,39
DAIMLER	Automobiles & Parts	DE	DE0007100000	5	25,00%	12.280,00	43,24
DANONE	Food & Beverage	FR	FR0000120644	5	38,46%	1.925,00	19,29
DEUTSCHE BANK	Banks	DE	DE0005140008	7	31,82%	-6.261,00	-61,93
DEUTSCHE POST	Industrial Goods & Services	DE	DE0005520004	7	35,00%	2.055,00	4,13
DEUTSCHE TELEKOM	Telecommunications	DE	DE0005557508	8	40,00%	4.754,00	21,11
E.ON	Utilities	DE	DE0000ENA9999	2	16,67%	-5.841,00	-103,40
ENEL	Utilities	IT	IT0003128367	2	33,33%	5.229,00	76,99
ENGIE	Utilities	FR	FR0010208488	11	57,89%	-5.262,00	-33,96
ENI	Oil & Gas	IT	IT0003132476	1	20,00%	-3.535,00	-125,15
ESSILOR INTERNATIONAL	Health Care	FR	FR0000121667	3	18,75%	1.120,00	18,36
FRESENIUS	Health Care	DE	DE0005785604	0	0,00%	3.262,00	14,67
GRP SOCIETE GENERALE	Banks	FR	FR0000130809	7	50,00%	5.878,00	40,34
IBERDROLA	Utilities	ES	ES0144580Y14	5	38,46%	2.931,30	94,75
Industria de Diseno Textil SA	Retail	ES	ES0148396007	2	25,00%	3.212,67	21,02
ING GRP	Banks	NL	NL0000303600	2	25,00%	5.680,00	103,51
INTESA SANPAOLO	Banks	IT	IT0000072618	5	26,32%	4.056,00	44,67
L'OREAL	Personal & Household Goods	FR	FR0000120321	6	40,00%	4.517,40	54,49
LVMH MOET HENNESSY	Personal & Household Goods	FR	FR0000121014	4	23,53%	5.983,00	47,73
MUENCHENER RUECK	Insurance	DE	DE0008430026	8	40,00%	3.223,00	74,00
NOKIA	Technology	FI	FI0009000681	2	25,00%	1.511,00	26,65
ORANGE	Telecommunications	FR	FR0000133308	6	40,00%	3.197,00	20,49
PHILIPS	Industrial Goods & Services	NL	NL0000009538	3	33,33%	623,00	5,52
SAFRAN	Industrial Goods & Services	FR	FR0000073272	4	23,53%	-1.355,00	-19,33
SAINT GOBAIN	Construction & Materials	FR	FR0000125007	6	40,00%	622,00	3,65
SANOFI	Health Care	FR	FR0000120578	5	35,71%	5.243,00	45,34
SAP	Technology	DE	DE0007164600	4	22,22%	3.991,00	51,84
SCHNEIDER ELECTRIC	Industrial Goods & Services	FR	FR0000121972	5	38,46%	1.736,00	10,85
SIEMENS	Industrial Goods & Services	DE	DE0007236101	6	30,00%	5.983,00	17,19
TELEFONICA	Telecommunications	ES	ES0178430E18	2	11,11%	316,00	2,43
TOTAL	Oil & Gas	FR	FR0000120271	4	33,33%	3.677,45	38,30
UNIBAIL-RODAMCO	Real Estate	FR	FR0000124711	4	36,36%	2.678,30	1.362,31
UNICREDIT	Banks	IT	IT0004781412	1	20,00%	1.775,88	40,84
UNILEVER NV	Personal & Household Goods	NL	NL0000009355	6	54,55%	7.133,00	42,23
VINCI	Construction & Materials	FR	FR0000125486	6	40,00%	3.022,00	16,30
VIVENDI	Media	FR	FR0000127771	6	42,86%	1.196,00	72,95
VOLKSWAGEN PREF	Automobiles & Parts	DE	DE0007664039	3	15,00%	-5.688,00	-49,89

Source: own representation based on the information from: <https://www.stoxx.com/index-details?symbol=SX5E>, retrieval date: 03/03/2017.

Table 2. Overview of the 50 EURO STOXX companies in 2015.

4. Findings

This section focuses in the first place on the enterprises which have women with STEM qualifications in their supervisory boards. Out of the 50 EURO STOXX companies three companies have three women with STEM qualifications, ten companies have two women with STEM qualifications and fourteen companies have only one women qualified in a STEM discipline in the supervisory board. This means that there are 43 women out of the total 220 women members of the supervisory boards of the EURO STOXX 50 companies which have a STEM educational background (see table 3).

In the following we provide a closer view on the companies having the highest women on their supervisory board and their qualifications and positions on board.

The French company Engie has the highest women quota of all companies included in EURO STOXX 50 index: 57,9%. The STEM quota of women in supervisory board is, however, 10,5% (see table 1), which means again that only two women of the eleven have a STEM background. These are Isabelle Kocher and Marie-Noelle Jégo-Laveissière, both engineers graduating from Corps des Mines, a highly esteemed institution in France. Isabelle Kocher is not just a member of the supervisory board, she is also the CEO of the company. The other nine women on supervisory board have different backgrounds, e.g. Ann-Kristin Achleitner graduated in economics and law. Françoise Malrieu has the chair of nomination and compensation committee, Marie-José Nadeau is member of the audit committee and Barbara Kux is member of the ethics, environment and sustainable development committee. Elected directors are Stéphane Pallez and Caroline Simon. Lucie Muniesa represents as director the French state, Catherine Gouillouard is director member of the strategy, investment and technology committee, and Anne-Marie Mourer is member of the appointments and compensation committee.

Unilever NV from the Netherlands has the second highest women quota (54,6%) of all 50 EURO STOXX companies. Six women are part of the supervisory board and three women work as executive directors. Yet, none of them have a STEM qualification. We had a look at the qualification the female supervisory members have in case of Unilever, and we found out for instance that Laura Cha has a law degree, Ann Fudge and Judith Hartmann hold a MBA, Louise Fresco has a degree in agriculture, Mary Ma has a bachelor of arts, while Hixonia Nyasulu has a bachelor of arts in psychology.

On third place in terms of women quota (with 40%) are two German companies: Deutsche Telekom and Muenchener Rueck. Again we saw that out all of the women serving as supervisory board members in these two companies, only a few have a STEM qualification. These are Sylvia Hauke, who is a skilled data processing officer, and Ines Kolmsee, who is an industrial engineer, both working for Deutsche Telekom, and Ursula Gather (working for Muenchener Rueck) with a degree in mathematics, which can be identified as a typical profession in the insurance branch.

If one looks at the companies with the most women with STEM qualifications in the supervisory board, the French company Sanofi leads with a STEM women quota of 21,4%,

followed by the German company SAP with a STEM women quota of 16,5%, and the Spanish Industria de Diseno with a STEM women quota of 12,5%.

What is should be mention here is that several women are members of different supervisory boards in different companies, e.g. Isabelle Kocher. In the same time, 27 companies out of the 50 EURO STOXX companies have at least one women with a STEM qualification, which is more than 50%.

To move further, from a statistical point of view the EURO STOXX 50 companies can be placed into five categories concerning the EBT as dependent variable (see table 3). Only Daimler (Germany) and Anheuser Busch-Inbev (Belgium) have achieved an EBT that is higher than 9.999 Mio. EUR. Most companies (16) are in the class between 0-2.999 Mio. EUR, from sectors such as ‘Telecommunications’, ‘Media’, ‘Real-Estate’, ‘Oil & Gas’, ‘Banks’ and ‘Industrial Goods and Services’.

	EBT		<i>Companies</i>
	<i>n</i>	<i>%</i>	
< 0 Mio. EUR	6	12	SAFRAN, ENI, ENGIE, VOLKSWAGEN PREF, E.ON, DEUTSCHE BANK
0-2.999 Mio. EUR	16	32	IBERDROLA, UNIBAIL-RODAMCO, AIR LIQUIDE, AIRBUS GROUP SE, DEUTSCHE POST, DANONE, ASML HLDG, UNICREDIT, SCHNEIDER ELECTRIC, CARREFOUR, NOKIA, VIVENDI, ESSILOR INTERNATIONAL, PHILIPS, SAINT GOBAIN, TELEFONICA
3.000-4.999 Mio. EUR	12	24	DEUTSCHE TELEKOM, L'OREAL, BCO BILBAO VIZCAYA ARGENTARIA, INTESA SANPAOLO, SAP, TOTAL, ASSICURAZIONI GENERALI, FRESENIUS, MUENCHENER RUECK, INDITEX, ORANGE, VINCI
5.000-9.999 Mio. EUR	14	28	BNP PARIBAS, ALLIANZ, BCO SANTANDER, BMW, AXA, UNILEVER NV, LVMH MOET HENNESSY, SIEMENS, GRP SOCIETE GENERALE, ING GRP, BASF, BAYER, SANOFI, ENEL
> 9.999 Mio. EUR	2	4	DAIMLER; ANHEUSER BUSCH-INBEV
Total	50	100	

Source: own representation based on the information from: <https://www.stoxx.com/index-details?symbol=SX5E>, retrieval date: 03/03/2017

Table 3. Five categories for the EBT of the 50 EURO STOXX companies in 2015.

The independent variable women quota and the number of women in supervisory boards can also be categorized into five classes (see table 4).

Interesting is that only one company has more than 10 women on the supervisory board considering that all EURO STOXX 50 companies have different numbers of employees and also different number of members on the supervisory boards. The company Engie (France) has 11 women out of the total 19 supervisory board members, which makes a women quota of 57.89%. As it can be seen Unilever NV too can be mentioned as a

company with a high women quota of 54.55%. In absolute figures, this means 6 women in a supervisory board which has 11 supervisory board members.

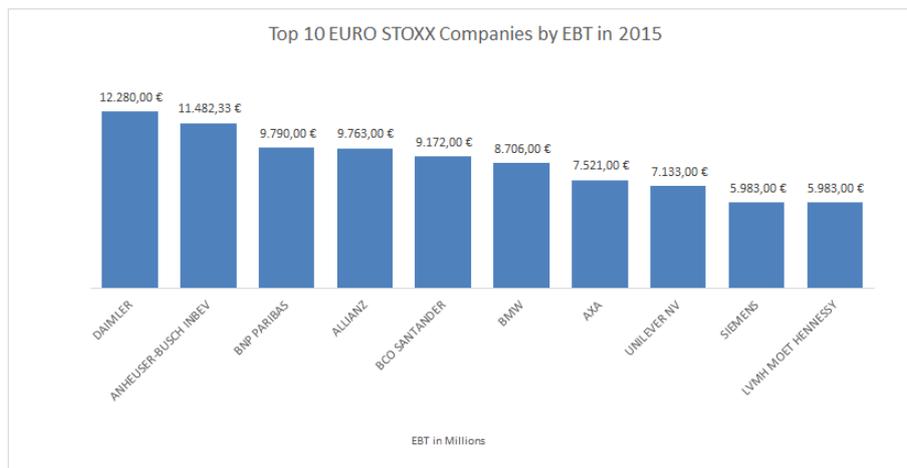
Most companies in EURO STOXX 50 index have 5 to 6 women on the supervisory board causing a women quota of 32% in average for this category.

Women quota			Number of women		
	n	% Companies		n	% Companies
0-20 %	10	20	0-1 women	3	6
					UNICREDIT, ENI, FRESINIUS
21-30 %	13	26	2-4 women	24	48
					ASSICURAZIONI GENERALI, BCO SANTANDER, UNIBAIL-RODAMCO, TOTAL, ALLIANZ, CARREFOUR, LVMH MOET HENNESSY, SAFRAN, SAP, BAYER, ASML HLDG, PHILIPS, BASF, BCO BILBAO VIZCAYA ARGENTARIA, ESSILOR INTERNATIONAL, VOLKSWAGEN PREF, ENEL, ING GRP, INDITEX, NOKIA, AIRBUS GROUP SE, E.ON, ANHEUSER-BUSCH INBEV, TELEFONICA
31-40 %	21	42	5-6 women	16	32
					UNILEVER NV, VIVENDI, L'OREAL, ORANGE, VINCI, SAINT GOBAIN, BMW, SIEMENS, AIR LIQUIDE, IBERDROLA, DANONE, SCHNEIDER ELECTRIC, AXA, SANOFI, INTESA SANPAOLO, DAIMLER
41-50 %	4	8	7-10 women	6	12
					DEUTSCHE TELEKOM, MUENCHENER RUECK, BNP PARIBAS, GRP SOCIETE GENERALE, DEUTSCHE POST, DEUTSCHE BANK
51-60 %	2	4	> 10 women	1	2
					ENGIE
Total	50	100	Total	50	100

Source: own representation based on the information from: <https://www.stoxx.com/index-details?symbol=SX5E>, retrieval date: 03/03/2017

Table 4. Five categories for the women quota of the 50 EURO STOXX companies in 2015.

In order to test the raised hypothesis (H1: Enterprises which have a higher gender quota in supervisory boards are more successful and achieve higher EBT), two steps are necessary. In a first step, the EBT and the EBT / employee of the selected companies should be examined. In a second step, the gender quota per sector and in total should be analyzed for supervisory boards and the findings should be brought together.



Source: own representation – the EBTs of all the 50 companies were taken from <http://www.finanzen.net/> - retrieval date: 03/03/2017.

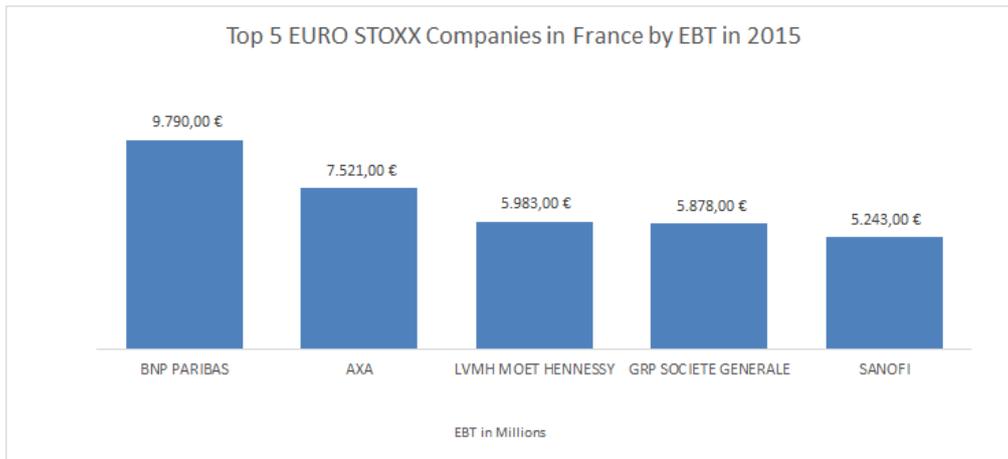
Figure 1. Top 10 EURO STOXX companies by EBT with figures of 2015 in million EUR.

Figure 1 shows a top 10 ranking of the EURO STOXX companies according to their achieved EBT in 2015. On the first place in 2015 was Daimler (Germany) with an EBT of €12.3 million, also the highest value of all companies analysed in this study. Daimler has overtaken Volkswagen (Germany), which was on the first place in 2014 with €10.8 million, but it suffered a serious draw back in 2015 due to the emissions scandal. Daimler is followed in the 2015 EBT ranking by Anheuser-Busch InBev (Belgium) with €11.5 million and BNP Paribas (France) with € 9.8 million.

However, at Daimler only one woman with a STEM qualification is present on the supervisory board. Among the top ten companies by EBT only BNP Paribas can be mentioned as having two women with STEM positions in supervisory board. BNP Paribas is not a typical company where one could expect engineers on the supervisory board. Nevertheless, two women with STEM qualifications are members of the supervisory board. A clear correlation in general between women in total in supervisory boards and especially STEM qualified women and EBT or EBT/ employee cannot be identified.

Due to the fact that the countries Germany and France have the highest number of companies in EURO STOXX 50 index and the highest EBT per company and per employee these two countries are examined more closely.

France is the country with the highest number of companies (20) included in EURO STOXX 50 index and it is an important country in terms of EBT. When the most important companies are analysed BNP Paribas is the biggest company with an EBT of €9.790 million, followed by the insurance company AXA with €7.521 million and LVMH Moët Hennessy with €5.983 million. GRP Société Générale and Sanofi are also in top 5 of the French companies by EBT and it can be observed that especially the sectors 'Banks' and 'Insurance' have the highest EBT values (see figure 2).

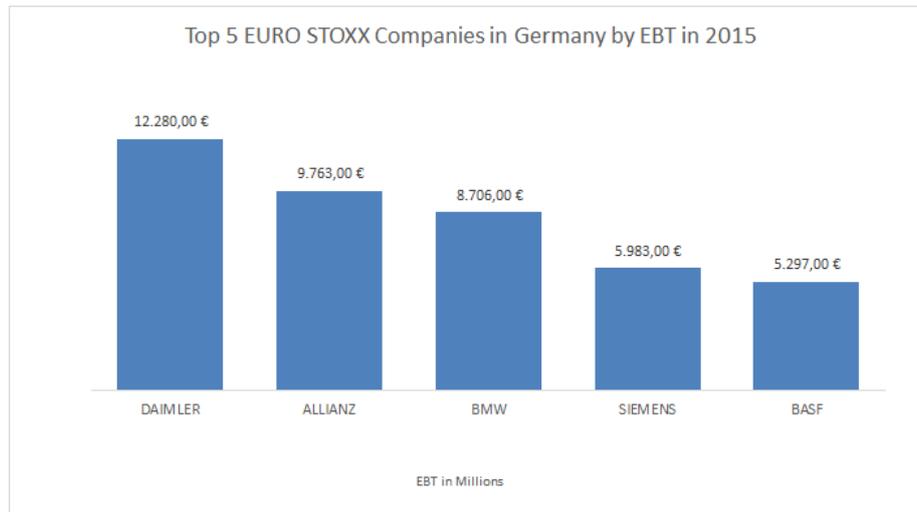


Source: own representation – the EBTs of all the 50 companies were taken from <http://www.finanzen.net/> - retrieval date: 03/03/2017.

Figure 2. Top 5 EURO STOXX companies in France by EBT with figures of 2015 in million EUR.

Looking to the five best companies by EBT in France, Sanofi has three women with STEM qualifications, while BNP Paribas and GRP Société Générale have each two women with STEM qualifications on the supervisory board. This is an indication that more than 50 % of the French best companies by EBT have two or three women with STEM qualifications in their supervisory boards, which shows a slightly positive correlation.

The second most important country from EURO STOXX 50 index in the year 2015 is Germany, which has 14 companies in this index. The highest EBT of all German companies was achieved by Daimler with €12.280 million followed by Allianz (€9.763 million) and BMW (€8.706 million). Siemens and BASF are also in this top 5 by EBT. Compared to France it can be seen that especially the automotive sector is represented twice in this range of companies with the highest EBT. The ‘Insurance’ sector seems to be strong in both France and Germany as in both countries, companies such as Axa and Allianz are in top 5 by EBT (see figure 3).



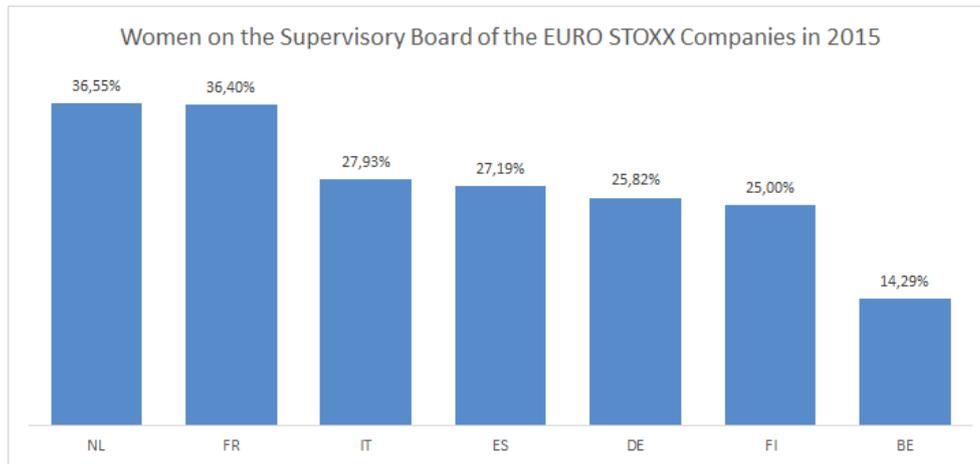
Source: own representation – the EBTs of all the 50 companies were taken from <http://www.finanzen.net/> - retrieval date: 03/03/2017.

Figure 3. Top 5 EURO STOXX companies in Germany by EBT with figures of 2015 in million EUR.

For Germany a slightly different situation can be observed. From five companies that were identified as best companies by EBT only three companies have one woman with a STEM background on board. German companies with two to three women with STEM qualifications on supervisory board are missing from this top five companies by EBT. The conclusion for Germany is that no correlation can be seen between the successful companies by EBT or EBT / employee and the women with STEM qualifications in supervisory board.

If by now the focus was on offering a broad insight on the EURO STOXX companies and the KPI EBT, in the following section the emphasis will be on completing this insight by introducing also the information on gender quotas in supervisory boards as found in the annual reports of the EURO STOXX companies. In this respect, figure 4 shows the percentage of women in supervisory boards in each of the 7 countries.

In six out of the seven countries the women quota in supervisory boards in 2015 is higher than 25% in average. The highest women quota in supervisory boards has Netherlands with 36.6% followed by France with 36.4%. Additionally, it can be seen that the expected women quota of 30 – 40% is not yet achieved by EURO STOXX companies.



Source: own representation – the information with regard to the number of women on the supervisory board was extracted from the 2015 annual reports of the respective companies.

Figure 4. Number of women on the supervisory board of EURO STOXX companies in 2015 in different countries.

5. Discussion of Results and Conclusion

As the statistical analysis of the previous section has shown, hypothesis 1 (H1: Enterprises which have a higher gender quota in supervisory teams are more successful and achieve a higher EBT) cannot be supported.

Especially for women with STEM qualifications, hypothesis 1 cannot be supported because no clear correlation can be seen between the EBT or the EBT / employee and the STEM women quota in supervisory boards.

It should be mentioned that the success of companies is not only driven by women in supervisory boards. All supervisory boards of the 50 EURO STOXX companies consist of men and women and the success of a company is also a result of the entire supervisory board, male and female alike. Furthermore, the presented findings should be supplemented by further research into the topic. One future research direction might be a detailed study on women in supervisory and management boards with STEM qualifications including for instance their exact positions or their leadership span.

The quota of women in the supervisory boards is shown in this article on basis of the year 2015. However, the development of the women quota in supervisory boards remains to a certain degree constant over a period of time. The reason is that the term of office of supervisory board members is fixed via contracts for a certain time span – e.g. five years.

For this reason no massive change of the women quota in supervisory boards is expected in short term. Additional research is needed to shed more light on this issue.

Moreover, as presented in the literature review, female participation in supervisory boards shows mixed results with regard to company performance. Therefore, a more holistic approach is needed, researching not only the number of women on board but also considering women participation in total workforce, industry' sectors, management, subsidiaries, etc.

In the same time EBT as a performance indicator provides only a rough approximation of company success, a combination of indicators could provide better results. Even the consequent measurement of the KPI EBT per employee in all cases as relative figure brings additional insights.

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