

In the Face of Success: A Study About CEO Facial Traits and Business Performance

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ABSTRACT

The main goal of this study is to examine the possible relationship between the facial width to height ratio of CEO's and the financial performance of their firms in Europe and to compare these results to a study by Wong et al. (2011) performed in the United States. A positive relationship was expected to be found in Europe as was in the United States. The effect was expected to be less strong in Europe than in the United States, because of differences in leadership. CEO facial width to height ratio was measured using photographs, while firm performance was measured by calculating return on assets and net profit margin. Correlation and regression analysis was performed to test the relationship. No significant evidence was found that supports the hypothesis that CEO facial width to height ratio influences firm performance.

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Keywords

CEO facial appearance, firm performance, facial width to height ratio, CEO influence, Europe, United States

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1. INTRODUCTION

The physical appearance of an individual can have an impact on many aspects of one's life. A study by Efran (1974) shows that the physical appearance of a defendant has a substantial effect on the judicial processes and trial outcome. The effects of physical appearance do not stop at the legal system. In the business world many researchers have found that many different physical characteristics, such as for example: gender (Farrell et al., 2005; Eagly et al., 1992), age (Ruegger & King, 1992) and attractiveness (Hosoda et al., 2006) play a role in interpersonal relationships, job related outcomes, trust and decision making. In the business world, the individual who exerts the largest influence on a firm is the Chief Executive Officer (CEO). Although interesting relationships have been found between psychological characteristics/physical characteristics and leader-effectiveness (Rule & Ambady, 2008) (Wong et al. 2011) (Eagly et al., 1992) (Hosoda et al. 2006), the effect of leaders' physical characteristics on effectiveness remains an area of uncertainty.

A study by researchers in the United States (Wong et al., 2011) found a significant relationship between a physical trait and business performance. They took a sample of companies from the fortune 500 list, and found a significant relationship between the facial width to height ratio (fWHR) of a CEO and their company's financial results. They found that the fWHR in men is linked to not only more aggressive behavior in a negative sense, but is also expressed as a bigger tendency towards risk taking and more effective leadership. Their research has been limited to the United States.

The objective of this research is to find a connection between facial structure (fWHR) and company performance in European large companies and to compare this to the results from the US study. In this research the aim is to answer the following empirical research question:

“Does the facial width to height ratio of a CEO in Europe influence the financial performance of their company, and how does this compare to CEO's in the United States?”

To answer this question, the relationship between the two variables: firm financial performance and CEO fWHR will be examined from CEO's in the Forbes 2000 company ranking list (2017), selecting only European companies. In the second section the literature will be reviewed and a hypothesis will be presented. The third section will explain the methodology and the data that was used. In the fourth section the results will be discussed and the fifth part will summarize the results in a conclusion and will discuss the implications and recommendations.

2. LITERATURE REVIEW (& HYPOTHESIS)

In this section, a review of the existing literature about the effect of fWHR on business results shall be provided. Additionally, a hypothesis about the effect within Europe shall be developed.

2.1 Literature Review

As was discussed in the introduction The aim is to reproduce the study of Wong et al. (2011), but in a European context. Wong et al. (2011) have found a significant correlation between CEO's facial width to height ratio and the financial performance of their company in the United States. This relationship is moderated by top management team's cognitive complexity. Wong et al. (2011) indicate that fWHR is associated with more aggressive behavior in men (as pointed out by Carre, McCormick & Mondloch, 2009). Although this increased aggression is often times described as socially undesirable, facial WHR can also be associated with more positive characteristics, such as a sense of

power. Men with a sense of power tend to view their external environment optimistically, attend task relevant information better and behave more goal-oriented. All together these characteristics are associated with more effective leadership and organizational success. This led to the hypothesis that organizations headed by male (fWHR is a sexually dimorphic trait) leaders with greater fWHRs would achieve superior organizational performance (Wong et al, 2011). To prove this hypothesis a sample of fortune 500 companies was taken and CEO fWHR was compared to firm performance. Significant evidence to support this hypothesis was found.

Wong et al.'s (2011) research was published in Psychological Science, which is one of the top ten psychology journals worldwide (6th), based on citation ranking/impact factor (“Scimago Journal & Country Rank”, 2017). With over a hundred citations since October 2011 (google scholar, 2018) this article has significantly impacted the academic research in this field of interest. Their study was the first study to have found a relationship between CEO fWHR and more effective leadership. Because this is a relatively new field of study, many facets of this relationship still need to be tested. Their research has been focused exclusively on companies within the United States. Testing the robustness and generalizability of the correlation between facial width to height ratio and financial performance, both in a transatlantic and general sense, can be of significant academic importance for future research. If this research proves to apply to both Europe and the United States, the robustness and generalizability of Wong's (2011) theory will be increased. If the findings of this study differ from the United States research this may be because of cultural differences. When theories about cultural differences are considered, such as Hofstede's (2016) (which will be explained shortly). Perhaps the European culture is less influenced by facial characteristics than the United States or the facial width is perceived differently and is not linked to more aggression, risk taking and effective leadership. Differences in cognitive complexity between the United States and Europe may also provide additional insights.

A study by Stoker et al. (2016) suggests that CEO's faces do not relate to firm's performance and openly debunk Wong's theory (2011). They criticize the one dimensional measure of fWHR and claim to have performed a larger sample of fortune 500 companies and a more sophisticated measurement of both facial shape and financial performance. Stoker et al.'s (2016) research showed no relationship between firm performance and facial structure, but between facial structure and the selection of CEO's, because a high width to height ratio of an individual's face was more common in leadership positions than in the general civilian population. They believe that CEO fWHR plays a part in the selection of leadership, but it does not dictate more effectiveness in leadership. To decide whichever theory holds true; a study of European companies can be useful.

Another research discovered that presidents of the United States with greater fWHR were rated higher in both achievement and motivation (Lewis et al., 2012). This supports Wong et al.'s (2011) theory that fWHR and performance are interrelated. A study by Rule and Ambady (2008) also shows that some element of financial success seems to be communicated through facial appearance.

The study of Wong et al. (2011) is the benchmark for this paper, because it has been acclaimed on a large scale internationally and provides a good basis of comparison. Similar or the same variables have been acquired as in Wong et al.'s (2011) research. In this paper CEO fWHR will be used, which was acquired in the same fashion and using the same measurement software. This will be compared to the firm performance indicator: Return On

Assets (ROA). As in Wong et al.'s (2011) research this paper will use CEO age, firm's past financial performance and firm size as control variables.

In this research the fWHR will be used as a quantifiable variable. The effects of facial features on behavior have been studied from many different angles. This research will be focused on (or limited by) the facial Width to Height Ratio. According to Carré & McCormick (2008) fWHR is a sexually dimorphic trait, in puberty male and female fWHR will start to develop differently in part due to increased testosterone levels in males (Carré & McCormick, 2008). Although the sexual dimorphism of fWHR is disputable, some research found no evidence for sexual dimorphism of facial width-to-height ratio. Therefore, this research will be limited to the effect of fWHR in male CEOs. We will not delve to deeply into the biological aspects of a difference in fWHR and focus on the financial results of a company.

This study is focused on continental Europe. The differences between companies from the United States and European companies are clearly existent. To understand the dimensions of national culture in respect to organizations and leadership the theories of Hofstede (1976, 1980, 1993, 2016) can be applied. Based on extensive cultural management research, Hofstede (2016) found and described six dimensions (Individualism vs collectivism, power distance, uncertainty avoidance, masculinity vs Femininity, long-term orientation and indulgence). Hofstede (2016) has made a clear comparison between countries in these dimensions with respect to leadership, motivation and organization. The main differences between companies from the United States and Europe exist within the individualism vs collectivism and the long-term orientation dimensions. Companies in Europe tend to be more collective and long-term oriented than companies from the United States who tend to be more individualistic and short term oriented. (Triandis et al., 1988) (Hofstede, 2016) (Luthans et al., 1995)

The differences in these two dimensions should influence the differences between this research and Wong et al.'s (2011) research. Wong et al. (2011) clearly describe a moderator variable: the role of leadership teams' cognitive complexity. Cognitive complexity refers to the degree to which individuals and teams construe their social world in a multidimensional way (Bieri, 1955). Teams of low complexity display a low degree of differentiation and have a rigid decision making style and are based mainly on authority and traditions. Teams of high complexity are of a more flexible decision making style and consider multiple points of view and a higher degree of differentiation. (Wong et al., 2011) Teams of low complexity increase the effect a CEO's fWHR has on company performance according to Wong et al.'s (2011) study. Combining Hofstede's (2016) research about the individualistic leadership style in the United States versus the collective leadership style in Europe and Wong et al.'s (2011) theories about leadership team complexity, it can be inferred that European companies in general have a higher degree of management team complexity than companies in the United States, and the effect of fWHR might be of smaller proportions in this Europe-oriented research

According to Brodbeck et al. (2000) even though there are common characteristics between European management systems, there is also a clear diversity between societal cultural diversity and diversity in management styles. If we consider Hofstede's (2016) work, substantial differences between all six dimensions can be perceived between southern Europe, Nordic Europe, Western Europe and Eastern Europe. It is expected that these differences in leadership concepts will slightly moderate the relationship in this research, but are not as severe as the

differences between the United States and Europe. These differences will not be tested in this research.

2.2 Hypothesis

Although Wong et al.'s (2011) findings are under debate, the hypothesis is that if a correlation exists in the United States, this should also be present in Europe. However, if we consider the cultural differences between the United States and Europe, and also within Europe itself, the correlation should be less strong in Europe. As Hofstede (2016) indicates, European management teams tend to lean more towards a collective leadership strategy than an individual leadership strategy, and thus the management team complexity should be higher in Europe. This should have a diminishing effect on the relationship between fWHR and business results. One of the drawbacks of this hypothesis is that when the relationship is weaker, it is also more difficult to prove. Nonetheless, even if no positive effect can be perceived the results can be compared to the results from the United States and should make for an interesting comparison. The hypothesis of this paper is:

H1a: *The facial Width-to-Height Ratio of a CEO in a European company has a positive effect on the business results of the company.*

H1b: *The effect is less strong in the United States, than it is in Europe.*

H0: *There is no relationship between the facial Width-to-Height Ratio of a CEO in a European company on the business results of that company.*

3. METHODOLOGY

In this section the model used in this research will be described. Additionally, the variables will be explained, and further information about the sample is provided. Furthermore, the process of data collection is described.

3.1 Model

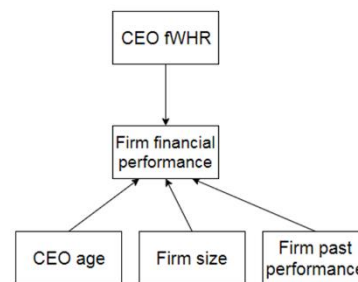


Figure 1. Conceptual model.

Figure 1 shows the conceptual model to support the theoretical framework. Following Wong et al. (2011) the variables age, size and past performance are control variables. Firm size is expected to have a positive effect on firm financial performance, because of economies of scale a larger company is expected to have increased performance (Orlitzky, 2001) (Pervan & Višić, 2011). Firm past performance is expected to be of great influence on the firm's current financial performance, because they are closely related. CEO fWHR is the independent variable, and firm financial performance is the dependent variable. CEO fWHR is expected to have a positive effect on firm financial performance, because as Wong et al. (2011) have found, a higher fWHR may be an indication of more effective leadership. Cognitive complexity is a moderator variable, unfortunately due to time and resource constraints, assessing cognitive complexity of each company is beyond the scope of this research.

Based on the findings from the literature the following model is constructed that resembles the relationship between CEO fWHR and firm performance (again: the mediator is left out of the regression analysis in this research):

$$\text{Firm performance} = \alpha + \beta_1 * \text{fWHR} + \beta_2 * \text{CONTROL} + \varepsilon$$

This model describes the effect that fWHR is expected to have on firm performance. The variables from this model will be explained in more detail in the next part.

3.2 Variables

3.2.1 Dependent variable: Firm financial performance

The dependent variable analyzed in this paper is the firm's financial performance. To measure financial performance Wong et al. (2011) chose to use the metric return on assets. Other researchers on this topic such as Rule & Ambady (2008) used net profit margin. In this research both return on assets and net profit margin will be used to analyze financial performance. These metrics were collected through official annual reports of each company in the sample. Return on assets and net profit margin of the book years 2016 and 2017 were calculated for each firm to average for annual differences and to have the most recent results. Return on assets is calculated by dividing a company's annual profits by the company's average assets of that book year. Net profit margin is calculated by dividing profits by revenue and multiplying with 100% (in layman's terms: the percentage of revenue that was profit.)

3.2.2 Independent variable: facial Width to Height Ratio

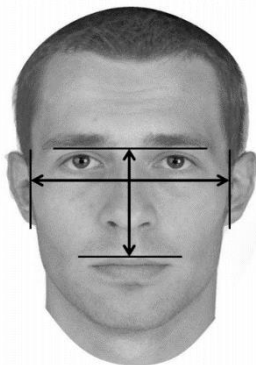


Figure 2. (Re &Rule, 2015)

The independent variable in this research is the fWHR (facial Width to Height Ratio). For the measurements of fWHR, Wong et al.'s (2011) example was followed. They used a method from Carré & McCormick (2008) and measured the distance between the lip and brow (height of upper face) and the left and right zygion (bizygomatic width) from CEO photographs. To instruct the individuals that performed the measurements, the example in figure 2 was shown to indicate which parts of the face to measure. For the photo selection process the internet was used to gather CEO photographs. In many cases the company's website and Google image search proved sufficient to collect two clear front facing photos per CEO of a useable resolution. The usability of the resolution was determined during the measurement process, the sides of the face needed to be clearly measurable without being too pixelated. Two independent measurements were taken of both the facial width and height. These measurements were performed twice (by two different individuals) to correct for measurement error. The average of these four measurements was

used to calculate the CEO fWHR. To perform these measurements, the software ImageJ (Rasband, 2011) was used.

Interrater agreement was high for overall fWHR ($\alpha=0,94$). Therefore, the four measurements for each CEO were averaged to create one single fWHR score for each different CEO ($M = 1,95$, $SD = 0,18$, $\text{Range} = 1,64 - 2,49$).

3.2.3 Control variables

Following Wong et al. (2011)'s previous research on strategic leadership we will control for CEO age, firms past financial performance and firm size.

CEO age is obtained from either company website or internet biographies. Firm past performance will be calculated by the average return on assets between the years 2009 and 2015. This statistic was calculated by manually finding the Profit and Assets of all six book years and was subsequently subdivided and averaged. However, in this research no data could be obtained to account for industry effects so industry means could not be subtracted in firm past performance, which unfortunately will be a slight deviation from Wong et al.'s (2011) method. Firm size is the number of employees currently employed by the company divided by 1000.

3.3 Sample

To test the hypothesis a list similar to the United States' fortune 500 was required. Since there is no fortune 500 list available for European companies, the Forbes global 2000 list was used. The Forbes global 2000 lists the 2000 largest public companies from over 60 countries worldwide. The companies are ranked based on four metrics: sales, profits, assets and market value. Market value calculation is as of 11 may, 2018. To be eligible for the list a company needs at least one of the following: Sales of \$4,47 billion, profits of \$333,3 million, assets of \$10,72 billion or market value of \$6,55 billion. Applying certain cutoff values, a composite ranking based on all four previous rankings is compiled. The highest composite score, receives the highest rank.

A sample of 43 companies was taken from this Forbes global 2000 list. The list contained 476 European companies. From this list 43 companies were randomly selected, 43, because The sample (n) should not exceed 10% of the population (N) The sample was subject to the availability of data. It was expected that not all 43 of these companies would meet the necessary requirements. A sample of at least 20 companies that met the requirements was desirable, but the higher the sample size the better. The following restrictions were applied during the selection process:

- The company CEO must be male
- Two clear and forward facing pictures of CEO's must be available
- Financial data from the book years 2016 and 2017 must be available.
- The company CEO must have been employed during the full course of the 2016 and 2017 book years.

After applying these restrictions 28 companies remained, from 13 different European countries. A list of all the companies analyzed and their country is provided in Appendix A.

4. RESULTS

In this chapter the results will be analyzed. First by testing for correlations, assessing the scatterplot, and by a regression analysis.

4.1 Correlations and Scatterplot

Table 1 shows the means, standard deviations and correlation of the variables. CEO age and firm size appears to have a negative effect on firm performance, although the effect of firm size is diminutive, this is the opposite of what was predicted in the hypothesis. As was expected past performance and net profit margin are positively correlated with firm performance. With low p-values this relationship is significant.

The researched variable of the utmost interest: CEO fWHR also seems to have a negative effect on firm performance, this implies

a lower fWHR should lead to increased firm performance, the opposite of our hypothesis. However, the p-value also exceeds the significance limit, this means H0 cannot be rejected.

The scatterplot in Appendix B visualizes the relationship between the dependent and independent variable. The scatterplot includes 3 points that due to the small sample size may be considered outliers, or points of large influence (the negative average performance points and the 2,5 fWHR point). After removing either or all of these 3 points. The direction of the trend line in the plot changes, but the correlations remain insignificant.

Table 1. Descriptive statistics and correlations (N = 28)

Variable	Minimum	Maximum	M	SD	Correlations				
					1	2	3	4	5
1.CEO Age	48	66	57,7	4,6					
2. Firm Size	791	226053	56065	61621	-0,3				
3.Past performance (2009-2015)	-8,5%	12,7%	4,4%	4,9%	-0,14	-0,09			
4.CEO fWHR	1,64	2,49	1,95	0,18	-0,262	-,09	-0,24		
5.Net profit margin	-6,92%	25,66%	10,14%	8,22%	0,014	-2,71	0,2	-0,11	
6.Firm performance (2016-2018)	-6,16%	11,81%	4,22%	4,45%	-1,65	-0,03	0,48*	-0,04	0,66**

Note: * Correlation is significant at the 0,05 level (2-tailed) **Correlation is significant at the 0,01 level (2-tailed)

Table 2. Regression results predicting firm's financial performance

Variable	Model 1: Base model <i>b (SE)</i>	Model 2: Full main effect model <i>b (SE)</i>	p value model 2 (sig.)
Control variables			
CEO age	-0,116 (140)	-2,414 (14,12)	0,635
Firm size (/1000)	0,011 (0,011)	0,013 (0,011)	0,264
Past performance (2009-2015)	0,325 (0,128) *	0,353 (0,137) *	0,018
Net profit margin	0,36 (0,077) **	0,364 (0,078) **	<0,000
Main effect			
CEO fWHR		2,544 (3,772)	0,508
Interactions			
R ²	0,63	0,639	
Adjusted R ²	0,560	0,548	
Δ R ²		0,009	

Note: * p <0,05 two-tailed
** p <0,01 two-tailed

4.2 Regression

To further test the hypothesis, financial performance (ROA) was regressed on the control variables. The R^2 is 0,63. This means the control variables explain 63% of the variance in firm financial performance. When CEO fWHR is added, this increases to 0,639, which is a difference of 0,9%. This small increase has a too large p-value which renders it insignificant, and signifies H_0 cannot be rejected. 63% is rather high for this model. That is because of the fact that net profit margin was added in the analysis. This variable does not precede ROA (firm performance), but covariates with the dependent variable. If net profit margin is omitted R^2 is 24,3% and increases to 24,5%. When ROA is replaced by net profit margin as a dependent variable, no novel significant relationships are unveiled. Furthermore, the 95% confidence interval of CEO fWHR' b is [-5,3 – 10,4]. These numbers are so far apart they resemble the entire firm performance sample range which is [-6,2 - 11,8].

Altogether neither of the hypotheses can be confirmed. However, due to the small sample size they cannot be rejected either.

5. CONCLUSION & RECOMMENDATIONS

In this final section of the research a conclusion will be provided and the limitations of this research will be described. Furthermore, future recommendations will be made.

5.1 Conclusion

The aim of this research was to examine the relationship between the facial width to height ratio of a European Company's Chief Executive Officer and the European firm's performance expressed in Return on Assets. The initial expectation was that a positive effect would be present in Europe, yet smaller than the effect in the United States. This relationship was tested by the collection of photographs from CEO's in several of Europe's top 500 companies. Subsequently the width and height of the faces in these photographs was measured using software. Firm performance was measured by calculating the two measures of performance: return on assets and net profit margin. After a correlation and regression analysis, no significant evidence was found to support the theory that CEO facial width to height ratio influences firm performance. The first hypothesis stated that there would be a positive relationship between CEO fWHR and firm performance. Regression analysis indicated the 95% confidence interval of the regression coefficient was anywhere between -5,3 and 10,4 with a p-value of 0,51. The mean of firm performance was 4,22 for with a SD of 4,45. This means no conclusions can be made about a positive or negative association. The only significant association that was discovered is between past performance and present performance. With a regression coefficient 0,353 and a p-value of 0,018. Of course the effect of past performance on present performance was expected to be stronger and more clearly present than that of CEO fWHR.

Even though the null-hypothesis cannot be rejected this research and the effect between CEO fWHR and firm performance is not present in this sample, it does not disprove Wong et al. (2011) either. As will be explained in the limitations section, there can be many factors that influence the relationship between CEO fWHR and firm performance. Wong et al. (2011) have found a strong modifier variable in the management team cognitive complexity. As Hofstede (2016) explains differences between individualism and collectivism are present between the United States and Europe. This is

expected to influence the impact of CEO fWHR on company's performance in Europe, but to further investigate that variable is beyond the scope of this research.

Companies in Europe tend to be more collective and long-term oriented than companies from the United States who tend to be more individualistic and short term oriented (Triandis et al., 1988) (Hofstede, 2016) (Luthans et al., 1995). The effect of the differences in long term orientation between the United States and Europe could also be translated to the variables in this research. According to Triandis et al. (1988) United States individualism translates in more self-reliance with competition and personal goals take precedence over group goals. While for European companies the opposite holds true. And even though top management teams are moreover being internationalized (Heijltjes et al., 2003). A clear difference in the impact of CEO's on the firm's top management team within the United States and Europe can be perceived. According to Fang-yi & Pao-Hung (2016) CEO's and top management teams dominate the organization strategy and this interaction effect can improve organizational performance. These differences can be the cause of not finding a significant relationship within this research.

Another theory that might explain the lack of a relation in this sample, is the research presented by Stoker et al. (2016), their research found no relationship between firm performance and CEO fWHR, but they did find that a high width to height ratio of an individual's face was more common in leadership positions than in the general civilian population. They believe CEO fWHR plays apart in the selection of leadership and does not dictate more effectiveness in leadership.

Perhaps Stoker (2016) is right, or perhaps in Europe the fWHR is simply less important than in the United States. Perhaps companies in the United States fare better under an aggressive leadership style than companies in Europe or perhaps many other cultural differences could have an impact on the effect of fWHR on firm performance. Without further research one can only speculate.

5.2 Limitations

The first limitation of this research is the relatively small sample size. From the first sample of 43 companies, only 28 remained. Similar research on the topic used higher sample sizes. Wong et al. (2011) used a sample size of 55 companies and Stoker et al (2016) used a sample of 150 CEOs. A larger sample size might have produced more accurate or different results. It would have reduced the margin of error and would have diminished the influence of outliers. The low sample size in this paper can be explained by a lack in statistical experience. A higher sample could have been used in this research. Exceeding the 43 samples from the list was possible and should have been preferred, but this was not applied and is a shortcoming of this research.

Another limitation of this study are the deviations from Wong et al.'s (2011) study. Unfortunately measuring the management team's cognitive complexity and making a correction for industry averages when measuring firm performance was beyond the scope of this research. The lack of these variables could have contributed to the low significance values in this research. If management team complexity was measured, a significant moderated relationship may have been found and this could have been compared to the United States.

5.3 Future Research Recommendations & Practical Implications

Further research on this topic can follow many directions. Firstly, it may be pertinent to repeat this research in Europe or any individual European country, but with a larger sample size

and a measure of management team's cognitive complexity. Another potentially fruitful study can investigate the difference of influence between CEO's in Europe and in the United States. There may be a significant difference in the way a CEO can influence the results of a company intercontinentally. Differences may be found in the cognitive complexity of management teams in firms or CEO's appearance may be of differing importance in Europe than in the United States. A last branch of investigation that will be suggested is to follow the example Stoker et al. (2016) have set. Maybe the relationship between CEO's facial appearance is more correlated with selection instead of performance. Since no significant relationship between CEO fWHR and firm performance has been found in this research, not many concrete practical implications for this research can be presented. Since no relationship has been found between CEO fWHR and company performance. Based on this research, companies seeking to improve their current ROA are not recommended to employ a CEO with a high fWHR, but should instead put more importance on improving their net profit margin and take firm's past performance in to account to manage expectations. Altogether it is recommended to study the effect of CEO's fWHR cross-culturally further before any serious practical implications can be suggested.

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8. APPENDIX

8.1 Appendix A: Sample Companies & Country

MOL Hungarian Oil	Hungary
Pgnig Group	Poland
Jazz Pharmaceuticals	Ireland
Enel	Italy
Banco de Sabadell	Spain
Swatch Group	Switzerland
Aon	United Kingdom
ASML Holding	Netherlands
Chubb	Switzerland
Solvay	Belgium
Experian	Ireland
SAP	Germany
Eni	Italy
Vivendi	France
Metro Group	Germany
Inter Rao	Russia
Givaudan	Switzerland
Royal Dutch Shell	Netherlands
NXP Semiconductors	Netherlands
Tatneft	Russia
ING Group	Netherlands
SGS	Switzerland
Sampo	Finland
Deutsche Pfandbriefbank	Germany
Aeroflot-Russian Airlines	Russia
Continental	Germany
Atlantia	Italy
BNP Paribas	France

8.2 Appendix B: Scatterplot

