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# Master Thesis U.S.E

## CEO Compensation Benchmarking in a European Context

Keywords: compensation benchmarking; executive compensation; remuneration benchmarking; CEO compensation; upwards biasing; compensation peer groups; Europe

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## **Abstract**

Fairness and equality are important matters to people. However, inequality has long been rising both in Europe, and particularly the US. This led to increasing levels of scrutiny on the high salaries of top-level CEOs.

Within the US, there has been extensive literature on CEO compensation and how it is benchmarked. A large amount of literature has found that benchmarking peers are often upwardly biased in order to extract additional rent for CEOs. While European attitudes towards inequality and unfairness are more negative compared to the US, no literature has yet looked into whether upward biasing of benchmarking peer groups similarly is an issue within Europe. This paper aims to fill that gap by comparing European companies' CEO compensation with those of their named peers.

This study utilizes the STOXX Europe 50 index as a proxy for large European companies and outlines total CEO compensation packages and compensation benchmarking peer groups for the indexed companies. This allows it to utilize t-tests and regression analysis to test various hypotheses derived from the literature.

The analysis shows that European companies, like their United States counterparts, do engage in upward biasing of peer groups. However, company size within Europe does not appear to have any significant effect on the occurrence of bias. Furthermore, the level of income inequality similarly does not appear to have an effect.

## **Introduction**

Equity and fairness considerations are of tremendous importance not only to society and people in general (Folger & Kass, 2000; Kelly, 2000; Beitz, 2001; Tabibnia et al., 2008; Wilkinson & Pickett, 2009), but also to CEOs when it comes to their compensation package (Chaigneau et al., 2022; Edmans et al., 2023). The existing literature suggests that fair compensation packages for top executives are not only important to attract top executive talent (Gabaix & Landier, 2006; Bizjak et al., 2008; Albuquerque et al., 2013; Cadman & Carter, 2014; Gruhle, 2016), but can also play an important role in maintaining motivation and aligning a CEO's interests with those of a company's shareholders (Gilson & Vetsuypens, 1993; Offstein & Gnyawali, 2005; Wade et al., 2006). Nevertheless, there are also clear reasons to keep compensation down. One such reason is to avoid public scrutiny (Kuhnen & Niessen, 2012; Carrothers, 2018; Batish et al., 2020), but some studies have also found that having too high CEO compensation may result in lower employee motivation and effort (Wade et al., 2006; Leon et al., 2020; Smulowitz & Almandoz, 2021). As such, striking a good balance is essential. One technique commonly used to achieve that is compensation benchmarking. A practice where a company chooses other comparable companies as peers and bases its compensation package around the compensation of its peers (Chowdhury, 2017). In theory, this provides a good way to balance both a fair market competitive wage in order to retain talent while minimizing the need for and consequences of having an overpaid CEO. In practice however, the effectiveness of executive compensation benchmarking has been hotly debated. While some research has insisted the effectiveness of compensation benchmarking (Bizjak et al., 2008; Albuquerque et al., 2013; Cadman & Carter, 2014), there has been an increasing amount of literature that has been critical of the practice and the biases that may arise from it (Faulkender & Yang, 2010; Laschever, 2013; Shin, 2013; Lu et al., 2016; De Vaan et al., 2018; Audia et al., 2021; Schneider, 2021; Frye et al., 2024).

One potential issue of compensation benchmarking is the issue of 'leapfrogging' addressed by DiPrete et al. (2010), as companies aim to attract top executive talent, they set their compensation package at the upper echelon of their compensation benchmarking peer group, this in return results in other companies which may be losing their talent as a consequence to follow suit and increase their compensation package as well, restarting the cycle. This then results in an ever-increasing compensation package and surging CEO pay. Another potential issue is in powerful CEOs having a say in which companies they benchmark against, which often results in a set of peers that have larger compensation packages compared to the focal company (Faulkender & Yang, 2010; Frydman & Jenter, 2010; Laschever, 2013; Shin, 2013; De Vaan et al., 2018; Audia et al., 2021; Schneider, 2021). This problem of upward biasing of peer groups is found to be particularly apparent in cases where the CEO is especially powerful (Faulkender & Yang, 2010; Frydman & Jenter, 2010; Shin, 2013; Audia et al., 2021), when companies are smaller and may want to signal their high aspirations (Schneider, 2021), and when a company is performing poorly or is not meeting its targets (De Vaan et al., 2018).

While some early studies on upward biasing challenged these results, stating that the bias found can be explained by the chosen research design leaving out potential peers, resulting in bias (Cadman & Carter, 2014). A 2018 US study addressed the concerns raised and found conclusive evidence to showcase that upward biasing was occurring in US-based companies (De Vaan et al., 2018). Despite the relatively large amount of studies conducted on US data, as well as some studies on compensation benchmarking in China, there have been no studies conducted within Europe to see if issues like upward biasing of peer groups are also present there. That is interesting, considering there are various reasons to expect European attitudes towards upward biasing to differ substantially. Historically, US executive compensation has been higher compared to that in Europe (Conyon & Murphy, 2000; Conyon & Schwalbach, 2000; Owen et al., 2006), European attitudes towards unfairness in general are more severely negative (Alesina et al., 2001), and the United States ranks among the highest countries in income inequality, whereas most European nations rank much lower (OECD, 2024), which therefore corresponds with more equal societies.

This paper aims to address this gap in the literature by answering the research question: “Does upward biasing of benchmarking peer groups also occur in Europe, and to what extent?” Furthermore, we wonder whether any potential biasing in peer groups is driven by company size or aspirational benchmarking and whether differences in societal characteristics like inequality are also related to upward biasing within Europe itself.

### **Literature Review and Theoretical Framework**

From 1980 to 2017 income inequality both in the US and Europe has grown substantially (Blanchet et al., 2022). In the US specifically, the gaps in income between upper-income and middle-income and lower-income households are rising and the share owned by the middle-income households is falling. Moreover, income growth is most rapid for the top 5 percent earners, and where wealth for US families in general is yet to recover from the great financial crisis of 2008, the richest 5 percent are the only group to have gained wealth since the crisis happened. (Pew Research Center, 2020) While net income after taxes has remained relatively stagnant in European countries since 2008, even this type of income inequality is still on the rise in the US (Filauro & Parolin, 2018).

This inequality is problematic as inequality directly contradicts fairness, which is something people care deeply about (Folger & Kass, 2000; Tabibnia et al., 2008). Fairness is even something that is hedonically valued; that is to say that it leads to higher feelings of happiness as it leads to activation of several reward regions of the brain, whereas tolerating unfair offers for material gain involves activation of regions related to the suppression of negative emotions and poor self-image (Tabibnia et al., 2008). Furthermore, fairness is important in the decision making and planning of people. Unfairness contradicts the accountability principle which states that the

allocation of resources should be based on factors that a person can influence, as opposed to factors they are unable to influence. (Konow, 1996) When distributive justice or fairness of outcomes breaks down and people no longer believe that their efforts are rewarded adequately, this changes their plans and expectations for the future (Folger & Kass, 2000).

Additionally, inequality is an issue for reasons unrelated to fairness. Inequality has been associated with higher levels of violent crime (Kelly, 2000), inequality is associated with social and political unrest (Beitz, 2001), and inequality has even been linked to lower levels of economic productivity, higher levels of health problems like obesity or mental illness, lower levels of child wellbeing, lower levels of trust in institutions, and even higher rates of high school dropouts, teen pregnancies, imprisonment, and homicide (Wilkinson & Pickett, 2009).

In line with this increasing problem of income inequality combined with the importance of fairness to people Pew Research Center (2020) reports that roughly 61 percent of Americans feel there is too much economic inequality, and for politically left-leaning Americans, this figure is as high as 78 percent. However, considering specifically compensation of CEOs Larcker et al. (2016) find that CEO pay compared to that of regular employees is seen as excessive by roughly 74 percent of Americans. Interestingly, that figure may become even higher as people become more aware of the true levels of CEO compensation as currently, the median guessed amount by American people of what a CEO from a Fortune 500 would earn is only roughly a tenth of what their actual compensation looks like (\$1 million compared to \$10.3 million). Additionally, roughly 62 percent of Americans feel that CEO compensation should be capped at a certain multiple relative to the average worker, where the median multiple named would be 6 times the wage of the average worker. This is a stark contrast compared to the real figure of approximately 210 times the wage of the average worker.

Perhaps it is therefore not surprising that this increasing amount of inequality has led to a similar increase in scrutiny on high salaries and other types of compensation for executives, particularly during financial downturns like the great financial crisis of 2008 or the recent COVID-19 pandemic (Shim & Lee, 2014; Carrothers, 2018; Batish et al., 2020). In the case of the great financial crisis in particular, as executive compensation became a vocal point of debate, this led to financial reforms like the Dodd-Frank Act aimed at providing more transparency, insight, and say for both the general public, shareholders, and executives (Shim & Lee, 2014). Furthermore, it was found that the mandated disclosure of CEO-employee pay ratios led to a larger decrease in CEO pay prior to disclosure for firms more sensitive to reputational effects, indicating the effect of public perception (Johnson, 2021). Additionally, Kuhnen and Niessen (2012) find that negative press coverage influences executive payment structure, leading to decreases in more contentious types of pay like stock options, opting instead for less contentious ones like salary. Finally, Li and Yang (2021) found that roughly 30 percent of companies decreased their CEO's pay during the COVID-19 pandemic in a gesture to 'share the pain' with employees.

Considering company performance then, aside from the potential waste of having an unnecessarily high compensation package for the CEO, it may also be problematic for other reasons. A wider CEO-employee pay gap has been linked to lower research and development efficiency, which is explained by reduced employee motivation and effort (Leon et al., 2020). Furthermore, it may lead to higher turnover of lower-level managers (Wade et al., 2006), and overpaid CEOs may also impact employee effort as feelings of injustice or envy are linked to a heightened likelihood of employee wrongdoing (Smulowitz & Almandoz, 2021).

Nevertheless, there are good reasons to offer high or at least market-competitive CEO compensation. Having competitive compensation is vital in order to attract and retain top executive talent, which is important for reaching company goals (Gabaix & Landier, 2006; Frydman & Jenter, 2010). Furthermore, if high compensation is combined with a properly structured compensation package with performance-based incentives, it can help align the CEO's interests with those of the shareholders (Gilson & Vetsuypens, 1993; Offstein & Gnyawali, 2005). Similarly, CEO motivation may be influenced by the level of compensation, where feeling that their wage is unfair can lessen motivation (Chaigneau et al., 2022; Edmans et al., 2023), and a lower-than-fair compensation conditional on a fall of output below a certain threshold level can be used effectively as a motivator to extract effort (Chaigneau et al., 2022).

One of the methods used in order to ensure both an equitable wage as well as a competitive one is the approach of compensation benchmarking (Gruhle, 2016). In essence, compensation benchmarking entails taking a benchmark, in the case of CEO compensation, that is, a group of other CEOs working for companies that are deemed comparable and setting a wage that's based on the resulting average. If the benchmarking peers are appropriately selected, this will ensure that both compensation and performance can easily be reflected upon in comparison to the benchmarked companies and their respective CEO's compensations, resulting in an effective compensation package that is closely tied to both the market wage and the performance of the CEO.

In recent years, compensation benchmarking has become an increasingly popular tool for setting and evaluating executive compensation (Chowdhury, 2017), not only in large publicly listed companies but even seeing widespread usage in large local US governments where it is similarly deemed important in order to maintain high-quality human capital (Thom & Reilly, 2015). Studies find that benchmarking can be effective in adjusting both the components of compensation as well as the level of compensation, leading to a more efficient total compensation package (Bizjak et al., 2008; Grinstein et al., 2021).

Compensation benchmarking, more specifically, executive compensation benchmarking, has not been free from controversy however. Various literature has found that companies have a

tendency to include firms with similar characteristics but higher than their own executive compensation in their benchmarking group, indicating strategic picking of peers to include in the benchmark (Faulkender & Yang, 2010; Laschever, 2013). Furthermore, a recent study found that smaller companies similarly have a tendency to engage in upward biasing, likely as a means to signal high aspirations for the future of the company (Schneider, 2021). Moreover, powerful CEOs who are overpaid compared to their peers are able to avoid compensation benchmarking, and powerful CEOs who are underpaid tend to utilize compensation benchmarking in order to increase their pay (Shin, 2013). Additionally, a study conducted by Faulkender and Yang (2010) found that the effect of upward biasing is not only present but also that it is stronger when peer groups are smaller when the CEO is the chairman of the board of directors, where the CEO has a longer tenure, and when directors are busier as they're also serving on other boards. Together these factors therefore indicate that it is common for benchmarks and thereby executive compensation to be upwardly biased, particularly in cases where CEOs hold more powerful positions or when board members are not large obstacles when it comes to increasing the CEO's compensation package.

However, there is also research suggesting upward biasing is not an issue. Bizjak et al. (2008) find that indeed, compensation benchmarking does significantly impact CEO pay. However, this impact is limited to the practical and efficient use of benchmarking in order to determine the market wage required to maintain valuable human capital, as opposed to rent-seeking behavior on the part of the CEO. Furthermore, a study conducted by Albuquerque et al. (2013) finds that comparatively highly paid CEOs chosen as benchmark peers can be explained through unobserved CEO talent as opposed to self-serving behavior. This would indicate that executive talent, not rent-seeking behavior is the primary cause for an otherwise upwardly biased peer group. Furthermore, research done by Cadman and Carter (2014) similarly finds no evidence to support upward biasing, and they argue that findings of rent-seeking behavior are likely due to improper choice of firms included in the analysis. More specifically, Cadman and Carter (2014) critique research like those of Faulkender and Yang (2010) as their study, which was conducted on firms listed under the S&P 400 and S&P 500, limited the potential disclosed firms as peers to firms listed under the S&P 900 which are only a subset of all disclosed firms. The reason this would be especially problematic is that peers not listed under the S&P 900 would not be included in the analysis, resulting in smaller companies being left out of the study by means of construction. This could indeed lead to an upward bias being found, even though there may not be one in reality due to the bottom range of benchmark groups being left out of the analysis. Outside of the United States, more specifically in China, some research also suggests that compensation benchmarking there, at least after disclosure, is having its intended effect since the regulatory requirement of disclosing executive compensation in comparison to peers has led to smaller pay-rises for overpaid executives and higher ones for comparatively underpaid ones (Jiang et al., 2016). Nevertheless, also in China there are potential drawbacks to be found in the use of compensation benchmarking. One study finds that while executive compensation in China

is positively correlated with firm performance, the pay-for-performance sensitivity is asymmetric. More specifically, there is compensation stickiness in the case of decreasing performance, meaning that while performance increases are likely to result in pay-rises, performance decreases are less likely to result in compensation cuts, especially in cases where the firm is on the lower end of the benchmark compared to its peers (Lu et al., 2016). This showcases an additional incentive for powerful CEOs to attempt to upwardly bias their peer group.

Regardless of these conflicting findings, there are reasons to be skeptical of current trends in executive compensation benchmarking. Research conducted by DiPrete et al. (2010) finds that the rapidly increasing executive salaries can be attributed to compensation benchmarking and the 'leapfrogging' that comes with it. Leapfrogging in this context describes the phenomenon where CEOs are attracted by setting a high salary based on the upper echelon of the benchmarking range, or in other words, setting a wage that is higher than those of comparable companies whom they are benchmarking against in order to attract top executive talent. This then becomes a trend as similar companies who are likely using one another as benchmarking peers utilize the same strategy in an attempt to achieve the same goals. This then results, even without upward biasing, in evergrowing executive compensation packages as each company seeks to get top executive prospects on board, resulting in the mean benchmarked salary continually increasing as the process is repeated.

Furthermore, a study conducted by De Vaan et al. (2018) addresses the critiques brought up by Cadman and Carter (2014) by utilizing an algorithm to collect data on the named peers of 4,290 companies, allowing for a much larger sample, with lower odds of biased data. Similar to the earlier mentioned findings, De Vaan et al. (2018) find evidence for upward biases, particularly in cases where incentives and opportunities to engage in upward biasing are more pronounced. Their study indicates that the likelihood of an upward bias is stronger when financial targets are not met or when the natural peers of the company are not as apparent. Furthermore, De Vaan et al. (2018) find that an upwardly biased peer group is strongly associated with a larger compensation package for the CEO, indicating that these biased peer groups over time indeed also have an effect on the total compensation package.

While the above-mentioned studies indicate that there are good reasons to assume that upward biasing and excessive executive pay are issues within the US, there is little to no literature on whether these same effects can be found within the context of the European Union or even Europe in general. Interestingly however, there are both reasons to expect similarities as well as differences between the two regions. Both the US and Europe have seen a sharp rise in executive compensation over the years (Owen et al., 2006), and similarly, both the US and Europe have seen large portions of the executive compensation package being in the form of stock-based pay (Patricia & Sakinç, 2023). However, executive pay still tends to be a lot higher within the US as



opposed to Europe (Owen et al., 2006), and stock-based pay is used to a larger extent in Europe as opposed to the US (Patricia & Sakinç, 2023). Furthermore, from the perspective of fairness considerations, you may also expect differences between the two regions, as Alesina et al. (2001) find that attitudes towards inequality between Americans and Europeans are substantially different. While inequality for Europeans leads to significantly reduced happiness, this effect is less pronounced for Americans, which is something the authors explain through Europeans' preferences for more equal societies, whereas Americans prefer higher social mobility. Furthermore, equality appears to be valued more through regulation, as equality institutions have been imposed through EU directives, which now exist in all EU member states (Witte, 2012).

Furthermore, even within Europe itself, there may be cross-country differences. A study conducted by Checchi et al. (2010) showcases some of these cross-country differences both in income inequality and opportunity inequality and links differences in opportunity inequality to public expenditure in education, union presence, and fiscal redistribution, effectively showcasing that inequality is at least in part a product of government policy. As such, it can be argued that opportunity inequality within a country and fairness concerns could be linked, which may similarly have an effect on the probability of biased peer groups occurring.

As such, the following hypotheses are reached:

Hypothesis 1: European companies strategically choose peers with higher-than-own CEO compensation packages.

Having peers with higher-than-own CEO compensation is strongly associated with an increase in own CEO compensation over time (De Vaan et al., 2018). Furthermore, having higher-than-own peer CEO compensation has been found to lead to compensation stickiness in cases of poor firm performance (Lu et al., 2016). As such, from a rent-extraction view, it is beneficial for a CEO to have a compensation peer group consisting of higher-than-own CEO compensation packages, as that is likely to lead to increased compensation over time in case of good performance and is unlikely to result in decreases in compensation in cases of poor performance. Therefore, if CEOs have the ability to influence the compensation benchmarking peers used to benchmark their compensation packages, they are likely to prefer peers who have higher compensation packages for the CEO. Considering we have seen evidence of such upwardly biasing behavior occurring both in the US (Faulkender & Yang, 2010; Frydman & Jenter, 2010; Laschever, 2013; Shin, 2013; De Vaan et al., 2018; Audia et al., 2021; Schneider, 2021) as well as China (Lu et al., 2016), taking in account also that incentives of European CEOs are not likely to be very different, we thus hypothesize that European companies, like their US and Chinese counterparts, strategically choose peers with higher-than-own CEO compensation packages.

Hypothesis 2: Companies with lower market capitalization, or smaller companies engage in strategic peer selection more heavily compared to companies with larger market capitalization.

In line with the findings of Schneider (2021), smaller companies in Europe may engage more heavily in upward biasing. As smaller companies not only experience the same benefits of rent-extraction behavior compared to larger companies but can additionally signal high aspirations and goals by selecting high-profile companies and CEOs as peers, as such I expect smaller companies to be more likely to engage in strategic peer selection.

Hypothesis 3: Companies who are based in more unequal societies (higher gini-coefficient) engage in strategic peer selection more commonly compared to companies based in more equal societies (lower gini-coefficient).

In line with the findings of Checchi et al. (2010), I expect cultural differences relating to the outlook towards inequality and fairness to possibly have an effect both on regulation surrounding upward biasing behavior, as well as the permissibility of the behavior itself so that it results in significant differences in the prevalence of biased peer groups. I expect that in more unequal societies, where perhaps fairness is not valued as strongly, CEOs might engage in rent-extracting behavior more often by upwardly biasing peer groups compared to countries where fairness and equality are of higher concern.

## **Methodology**

### ***Method***

I utilize the STOXX Europe 50 index in order to approximate the European market, particularly blue chip companies. For companies included in this index I research their CEO total compensation and additionally investigate whether they utilize compensation benchmarking for executive compensation. When compensation benchmarking is used, I confirm in reports and regulatory filings which peers they utilize for their compensation benchmarking. When these peers are publicly disclosed, I additionally research the CEO compensation package for any named peers so that the average total compensation for named peers can be calculated for any company that publicly discloses their peers. Aggregating this data then allows us to see whether or not companies on average disclose peers that have higher-than-own CEO compensation by the use of t-tests. Furthermore, we can then look into the effect of market capitalization and the inequality statistic of gini-coefficient on the difference between own and peer CEO compensation by utilizing a combination of single and multiple regression analysis. A clear advantage of this methodology is that all named and publicly disclosed peers are included in the analysis, including ones outside of Europe. As such, no bias can arise from the exclusion of certain peers.

## ***Data***

In order to collect data I make use of four primary types of sources. Firstly, I utilize FactSet in order to collect the constituents of the STOXX Europe 50 as well as background data. Secondly, I use a variety of annual reports, universal registration documents, proxy statements, and other various types of reports and regulatory filings, as well as in rare cases newspapers depending on the availability of data in order to collect data on total CEO compensation and peer groups. Thirdly, I utilize OECD for inequality data. Finally, I make use of Exchange-Rates.org in order to convert CEO compensation to euros in cases where they are reported in a different currency. Individual variables and their sources are outlined below.

The primary variable of interest, CEO total earnings, is collected manually by going through annual reports, universal registration documents, proxy statements, remuneration reports, or other regulatory filings in order to extract the total compensation package given to the CEO for the 2023 fiscal year in euros. In rare cases where none of these primary sources indicate the compensation package, third party sources like newspapers or other third-party websites are used.

The second primary variable of interest, namely the reported peer companies or the peer group, is also collected manually through a similar process, albeit with the addition of remuneration policy reports as a source. Peer companies were researched for all 50 companies in the STOXX Europe 50. In most cases, both the CEO compensation package and peer group companies can be found in the same report; when this was not the case, remuneration policy reports were additionally consulted. In some 12 out of 50 cases, peer groups were either not used for the purpose of compensation benchmarking, not disclosed, or were only described in imprecise terms so that specific companies could not be extrapolated. Overall, 1045 companies were named as peers, of which 334 companies were unique.

Company tickers are then gathered through FactSet and are used to link companies and their total compensation package. This also allows us to calculate the average CEO total compensation package for named peers for each company that names its peers in the index.

Another variable of interest is the market capitalization of any company that is included either in the original STOXX Europe 50 index or named as a peer. This data is collected through FactSet.

Additionally, the company country, or the country where a company's primary stocks are listed in is gathered by using FactSet.

Finally, gini-coefficients extrapolated from OECD are used to gather inequality information for the country in which a company is listed.

As can be seen in Table 1, among the 50 companies included in the STOXX Europe 50 index, the average CEO total compensation amounted to 8.41 million euros, with the lowest being 2.10 million euros and the highest amount being 19.37 million euros. Meanwhile, the average CEO compensation for named peers is on average 10.66 million euros, with the lowest being 4.59 million and the highest being 22.79 million. Additionally, the average difference in CEO and average peer CEO compensation is 1.99 million, though there were large variations, with the lowest difference being 9.09 million less than the own CEO pay and the highest being 14.11 million euros more than the focal companies' own CEO pay. On average, the difference in compensation denoted in percentages relative to own CEO compensation, in other words, how much more on average the peer CEOs earn percentually compared to the own CEO is 48%, with the minimum being 55% lower than own CEO compensation, and the highest being 368% higher than own CEO compensation. Meanwhile, the biased/unbiased dummy variable has a range from 0 to 1, where 1 indicates that the average CEO of peers is at least 10% higher than own CEO pay, and where 0 denotes that it is less than 10% higher in comparison to own CEO pay. The average of this biased/unbiased variable is .63, indicating that 63% of indexed companies have an at least 10% upwardly biased peer group. Furthermore, the average gini-coefficient for the 50 companies in the index is set at .32 with a minimum of .26 and a maximum of .35. The average market cap for these 50 indexed companies is 125.99 billion euros, with the lowest instance being 36.22 billion euros and the highest being 445.92 billion euros. Finally, the number of named peers was on average 27.5, with the lowest being 5 and the highest being 79.

**Table 1. Descriptive Statistics for companies included in STOXX Europe 50 index**

Variable	Obs	Mean	Std. Dev.	Min	Max
CEO Compensation	50	8409.53	3974.54	2097.02	19367.47
Peer CEO Compensation	38	10655.53	4520.29	4594.72	22791.1
Compensation Difference	38	1993.96	5273.91	-9092.54	14109.52
Compensation Difference %	38	.48	.89	-.55	3.68
Biased	38	.63	.49	0	1
Gini-coefficient	50	.32	.03	.26	.35
# Peers Named	38	27.5	15.83	5	79
Market Cap	50	125.99	90.92	36.22	445.92

CEO compensation, peer CEO compensation and difference between peer and own CEO compensation are reported in thousands of euros. Market cap is reported in billions of euros

Furthermore, looking again at the subset of data included under the STOXX Europe 50 index, Table 2 below outlines the pairwise correlation statistics between the main variables of interest. Most notably, we can see a large negative correlation of -0.56 between CEO compensation and compensation difference, indicating that companies that have higher CEO compensation have comparatively lower or even negative differences in focal versus peer CEO compensation. Additionally, the opposite is true as well, when peer compensation is higher, the difference in focal versus peer CEO compensation tends to be larger or more positive. Furthermore, the correlation statistic between gini-coefficient and focal CEO compensation is somewhat sizable

and positive at 0.31, indicating that there is a correlation between companies being based in more unequal countries and higher CEO compensation.

**Table 2. Pairwise correlations of main variables for companies included in STOXX Europe 50 index**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CEO Compensation	1.00							
(2) Peer Compensation	0.26	1.00						
(3) Compensation Difference	-0.56	0.66	1.00					
(4) Compensation Difference %	-0.61	0.47	0.88	1.00				
(5) Biased	-0.56	0.42	0.80	0.68	1.00			
(6) Gini-coefficient	0.31	0.05	-0.14	-0.02	-0.09	1.00		
(7) # Peers Named	0.12	-0.23	-0.30	-0.11	-0.37	-0.10	1.00	
(8) Market Cap	0.19	0.25	0.03	-0.03	-0.12	-0.31	-0.03	1.00

Considering all observations, including companies named as peers but not originally in the index, we see in Table 3 below that mean compensation is higher at 11.56 million euros (compared to 8.41 million), but there is also a larger range as the minimum observed compensation is much lower at roughly 186 thousand euros (compared to 2.10 million) and the maximum is much higher at 149.54 million euros (compared to 19.37 million). Furthermore, the mean gini-coefficient is slightly higher at .34 (compared to .32), the minimum remains identical at .26 and the maximum is somewhat higher at .4 (compared to .35). Finally, the average market cap is lower at 105.32 billion euros (compared to 125.99 billion) but the range is much larger with a minimum of 2.06 billion (compared to 36.22 billion) and a maximum of 3089.05 billion (compared to 445.92 billion). It may additionally be noted that the number of observations differs across the three variables. The reason for that is firstly due to not all companies named as peers being publicly traded, such that a market capitalization is not available for some companies. Furthermore, a second reason is that OECD does not have a gini-coefficient statistic available for all countries from which named peers are listed. Due to these missing observations in gini-coefficient and market capitalization only being in place for some of the peer companies however, not companies included within the index, it does not have any effect on the results of the analysis.

**Table 3. Descriptive Statistics for all observations**

Variable	Obs	Mean	Std. Dev.	Min	Max
CEO Compensation	333	11566.66	13126.75	186.57	149543.56
Gini-coefficient	326	.34	.04	.26	.4
Market Cap	329	105.32	275.65	2.06	3089.05

CEO compensation, peer CEO compensation and difference between peer and own CEO compensation are reported in thousands of euros. Market cap is reported in billions of euros

Finally, as can be seen in Table 4 below, the correlation statistics for the subset and complete dataset are quite similar, though it is noteworthy that there is an increase in the focal CEO compensation and market cap correlation statistic, going up to .39 (compared to .19) when including all observations.

**Table 4. Pairwise correlations for main variables for all observations**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CEO Compensation	1.00							
(2) Peer Compensation	0.26	1.00						
(3) Compensation Difference	-0.56	0.66	1.00					
(4) Compensation Difference %	-0.61	0.47	0.88	1.00				
(5) Biased	-0.56	0.42	0.80	0.68	1.00			
(6) Gini-coefficient	0.55	0.05	-0.14	-0.02	-0.09	1.00		
(7) # Peers Named	0.12	-0.23	-0.30	-0.11	-0.37	-0.10	1.00	
(8) Market Cap	0.39	0.25	0.03	-0.03	-0.12	0.23	-0.03	1.00

As during the data collection it was found that there were large differences in size between US and non-US CEO compensation packages, as can be seen in Table 5 below, this prompted some additional analysis. As can be read in the table, CEO compensation for US-based peers was on average roughly 22 million euros, whereas non-US companies either named as peers or included in the index had a compensation package of just 6 million.

**Table 5. Total CEO compensation in thousands for US versus non-US companies**

CEO compensation	Obs	Mean	Sd	Min	Max
Non-US	220	6051.43	4286.76	186.57	29703.55
US	113	22304.28	17285.06	1254.71	149543.56

While this figure is not representative of the average CEO compensation package at a US company, since peers may be tactically chosen specifically because of their large compensation packages, this finding did motivate additional analysis where US peers were excluded. As such, the descriptive statistics will be shown and discussed below for additional analysis of where American peers were excluded. For convenience of comparison, figures including US peers are additionally shown in brackets.

As can be seen in Table 6 below, corresponding to the descriptive statistics for index companies, excluding United States peers, the average CEO compensation for named non-US peers is on average 7.72 million (10.66 million), with the lowest remaining unchanged at 4.59 million and the highest being 12.92 million (22.79 million). Additionally, the average difference in CEO and average non-US peer CEO compensation is negative 0.93 million, or 0.93 million euros lower than own CEO pay (1.99 million higher than own CEO pay), with the lowest difference being 9.81 million less than own CEO pay (9.09 million less), and the highest being 4.83 million more (14.11 million more). On average, the difference in compensation denoted in percentages relative to own CEO compensation is 9% higher (48% higher), with the minimum being 60% lower (55% lower) than own CEO compensation and the highest being 147% higher (368% higher) than own CEO compensation. Meanwhile, the average of the biased/unbiased dummy is .42 (.63), indicating that 42% (63%) of indexed companies have an at least 10% upwardly biased peer group. Finally, the number of named peers excluding US peers was on average 22.05 (27.5), with the lowest being 2 (5) and the highest being 73 (79).

**Table 6. Descriptive Statistics for companies included in STOXX Europe 50 index, excluding US peers**

Variable	Obs	Mean	Std. Dev.	Min	Max
Peer CEO Compensation	38	7726.62	1962.16	4594.72	12917.82
Compensation Difference	38	-934.95	3895.93	-9814.13	4827.03
Compensation Difference %	38	.09	.52	-.6	1.47
Biased	38	.42	.5	0	1
# Peers Named	38	22.05	15.59	2	73

As for the pairwise correlations, again corresponding to the STOXX Europe 50 index, as can be seen in Table 7 below, we see that the negative correlation between CEO compensation and compensation difference has strengthened further, as it now has a correlation statistic of  $-0.88$  (previously  $-0.56$ ). Furthermore, the correlation between peer compensation and compensation difference has interestingly weakened as it is now  $.14$  compared to the compensation statistic of  $.66$  before. Though, at large, most correlation statistics remain fairly similar.

**Table 7. Pairwise correlations of main variables for companies included in STOXX Europe 50 index, excluding US peers**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CEO Compensation	1.00							
(2) Peer Compensation	0.35	1.00						
(3) Compensation Difference	-0.88	0.14	1.00					
(4) Compensation Difference %	-0.82	0.05	0.89	1.00				
(5) Biased	-0.68	0.20	0.82	0.87	1.00			
(6) Gini-coefficient	0.31	0.13	-0.19	-0.02	-0.04	1.00		
(7) # Peers Named	0.11	-0.45	-0.34	-0.28	-0.28	-0.12	1.00	
(8) Market Cap	0.19	0.20	-0.14	-0.22	-0.16	-0.31	-0.06	1.00

Considering all observations, but excluding those based in the United States, as can be seen in Table 8 below, we additionally see some differences compared to the descriptives including all companies. Mean CEO compensation is lower at 6.05 million (previously 11.56 million), the minimum remains identical at 0.19 million, and the maximum is lower at 29.70 million (previously 149.54 million). The mean gini-coefficient is lower at  $.31$  (previously  $.34$ ) the minimum remains identical at  $.26$ , and the maximum is also lower at  $.35$  (compared to  $.40$ ). Finally, the mean market capitalization is nearly halved at 53.55 billion (previously 105.32 billion), the minimum remains the same at 2.06 billion, and the maximum is substantially lower at 445.92 billion (previously 3089.05 billion). Again, the number of observations differs slightly between the variables, and this is due to some missing cases due to some private companies being included so that market capitalization cannot be calculated, as well as missing gini-coefficients due to OECD not having these gini-coefficients available for all countries. As stated previously, this does not have any effect on analysis.

**Table 8. Descriptive Statistics for all observations, excluding US-based companies**

Variable	Obs	Mean	Std. Dev.	Min	Max
CEO Compensation	220	6051.43	4286.76	186.57	29703.55
Gini-coefficient	213	.31	.02	.26	.35
Market Cap	217	53.55	66.51	2.06	445.92

Finally, as can be seen in Table 9 below and Table 4 above, the correlation statistics between all observations excluding US peers and including US peers are quite similar. The correlation between CEO compensation and compensation difference is different, in the same way as discussed previously for Table 7, but outside of those two examples, there are no large differences.

**Table 9. Pairwise correlations for main variables for all observations, excluding US peers**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) CEO Compensation	1.00							
(2) Peer Compensation	0.35	1.00						
(3) Compensation Difference	-0.88	0.14	1.00					
(4) Compensation Difference %	-0.82	0.05	0.89	1.00				
(5) Biased	-0.68	0.20	0.82	0.87	1.00			
(6) Gini-coefficient	0.55	0.13	-0.19	-0.02	-0.04	1.00		
(7) # Peers Named	0.11	-0.45	-0.34	-0.28	-0.28	-0.12	1.00	
(8) Market Cap	0.39	0.20	-0.14	-0.22	-0.16	0.23	-0.06	1.00

The complete dataset, including sources for each individual compensation package and/or peer group, is available for download [here](#).

### ***Research approach***

When it comes to the statistical approach, first three one-sided t-tests are conducted. The first t-test tests whether the average total CEO compensation of peers is statistically significantly higher than the total compensation package for the focal CEO. Secondly, a t-test is conducted to establish whether the percentage difference between own and peer compensation is statistically significantly larger than zero, i.e., whether the relative difference between own and average peer CEO compensation is statistically significantly larger than zero, which is the expected level if companies are not purposefully upwardly biasing their peer groups. Finally, a t-test to test whether bias also exists in the binary format of the biased/unbiased dummy is conducted. Since the biased/unbiased dummy is formulated such that differences where the average peer CEO compensation is at least 10% larger than the compensation package of the focal CEO corresponds to a dummy value of 1, and situations where the difference is lower than 10% or negative correspond with a dummy value of 0, the expected value of this dummy under a normal distribution where the mean difference between focal and peer CEO compensation is zero equals roughly .4602, which corresponds to a z score of 0.1. As such, the corresponding t-test checks whether the mean of the biased/unbiased dummy is larger than that same value of roughly .4602 corresponding with the .1 z-score.

These 3 tests combined allow us to test for hypothesis 1.

Furthermore, the second and third hypotheses are tested by making use of three similar combinations of three different regression models. The first model type regresses the compensation difference between focal and peer CEOs on the focal firm's market capitalization.



The second model similarly regresses the compensation difference on the natural logarithm of the gini-coefficient for the country where the firm is listed. Finally, the third model combines the two previously mentioned models as it regresses the compensation difference in both the market capitalization and natural logarithm of the gini-coefficient. Additionally, an f-test will be conducted to test the significance of joint effects of both differences in market capitalization and differences in gini-coefficients combined. These 3 models and the corresponding f-test are then repeated twice, once where, instead of the absolute difference, the percentage difference is regressed, and once more where the biased/unbiased dummy variable is regressed.

Finally, as mentioned in the previous section, additional analysis is conducted in which US-based peers are excluded to compare results with and without US peers. This additional analysis is conducted in the exact same manner as outlined above, with the sole exception being that the regressed variables are calculated as if the US-based peers that were named actually were not named as peers, i.e., US peers are ignored.

## **Results**

### ***Initial analysis***

To test whether total CEO compensation for the focal company was higher, lower, or equivalent to the total compensation packages of named peers for the same 2023 fiscal year, we utilize 3 different t-tests comparing the total compensation package of the focal CEO and the average total compensation package of named peer CEOs. As can be seen in Table 10 below, and in line with the first hypothesis, all 3 test statistics are statistically significant. The first t-test comparing focal CEO compensation compared to the average CEO compensation of peers in absolute terms returns a test statistic of 2.33 this indicates that there are indeed statistically significant differences between the compensation of the focal CEO and the CEO of peers at the 5 percent significance level. More specifically, the expected difference in compensation between the focal CEO and the CEO of peers is roughly 2 million euros in favor of the CEO of peers for the same fiscal year. Considering that the average total compensation for focal CEOs in this sample of 38 companies who reported their peers is just 8.66 million, this difference of 2 million indicates a relatively large effect. Furthermore, the t-value of the relative compensation difference, measured in percentage difference between own and average peer CEO compensation, has a test statistic of 3.34 and a corresponding p-value that is significant at the 5 and even 1 percent level. As the mean of the relative compensation difference is 0.48, this indicates that on average, the peer CEOs have 48% higher compensation compared to the focal CEO, again showcasing a large upward biasing effect. Finally, the binary variable indicating either a biased peer group, in cases where the peer CEOs on average earn at least 10 percent more than the focal CEO, or a non-biased peer group when the upward bias is less than 10 percent, showcases a test statistic of 2.16 which means that also this test showcases that companies are statistically significantly more likely to be upwardly biased as compared to a normal distribution where the mean level of bias is

null. As the mean of the value is .63, this indicates that 63% of companies have at least 10% higher peer compensation figures compared to that of their own CEO.

**Table 10. One-sample t-test for differences between own and peer CEO compensation**

	Obs	Mean	St Err	t-value	p-value
Compensation Difference	38	1993.96	855.54	2.33	.0127
Compensation Difference %	38	.48	0.14	3.34	.0009
Biased/unbiased	38	.63	0.08	2.16	.0186

This therefore indicates that indeed European companies are selecting peers strategically in order to extract additional future rent by making use of an upwardly biased peer group. This effect is robust across the three different ways of measuring and is additionally large in size. As such we can confirm our first hypothesis.

As for the second and third hypotheses, we utilize 3 different sets of 3 regression models. First, we test the effects of market capitalization and the natural logarithm of the gini-coefficient individually in a single regression model, and then we utilize a combined multi-regression model to test whether effects are persistent across the models. We run these regression models across the three different variables that were also used in Table 10 that were used to indicate bias as the regressed variable.

As can be seen in Table 11 below, where the absolute difference in thousands of euros between focal and peer CEO compensation is the regressed variable. The effect of market capitalization does not appear to have any significant effect in both the isolated as well as the combined effect model. This would therefore indicate that contrary to hypothesis 2 and what was found by Schneider (2021), where smaller United States-based companies were likely to choose aspirational peers, this may not be the case for European companies. Similarly, it appears the natural logarithm of the gini-coefficient, the inequality measure used, also has no statistically significant effect. While the coefficient size is large, this is likely due to the range of the variable being extremely small (from -1.36 through -.93). As such, this result would indicate that the level of inequality in a company's country does not have any statistically significant relation on the difference between focal and peer CEO compensation. Furthermore, when running an f-test on the joint significance of market cap and the gini-coefficient, we again see no statistically significant effect as the reported f statistic equals 0.64

**Table 11. Effect of company size and country inequality on own-versus-peer compensation.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	1.92 (9.42)		-0.84 (9.91)
Gini-coefficient (ln)		-10,830.20 (11,360.29)	-11,140.78 (12,087.20)
Constant	1,748.56 (1,482.47)	-10,592.12 (13,229.88)	-10,845.72 (13,744.69)
Observations	38	38	38
R-squared	0.00	0.02	0.02

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In the model where the regressed variable is the relative difference between focal and peer CEO compensation expressed in percentages, we see highly similar results as in the previous model. None of the effects are statistically significant, and the coefficients are very close to zero, thus indicating that likely neither market capitalization nor the gini-coefficient has any effect on the relative level of upward biasing. Also, the f test for the joint significance of the two variables in the combined model supports this idea as it has an extremely low f statistic of just 0.05, showing a lack of joint significance.

**Table 12. Effect of company size and country inequality on own-versus-peer compensation denoted in percentages relative to own CEO total compensation.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	-0.00 (0.00)		-0.00 (0.00)
Gini-coefficient (ln)		-0.35 (1.94)	-0.51 (2.06)
Constant	0.52** (0.25)	0.08 (2.26)	-0.05 (2.35)
Observations	38	38	38
R-squared	0.00	0.00	0.00

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Finally, the binary model is again highly similar; none of the effects across the three models are statistically significant, both coefficients are quite close to zero, and the joint significance test gives an f statistic of .61, again showing a lack of both individual and joint significance.

**Table 13. Effect of company size and country inequality on odds of bias occurring.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	-0.00 (0.00)		-0.00 (0.00)
Gini-coefficient (ln)		-0.60 (1.06)	-0.92 (1.12)
Constant	0.71*** (0.14)	-0.07 (1.24)	-0.33 (1.27)
Observations	38	38	38
R-squared	0.01	0.01	0.03

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

As across all 9 model variations aimed at testing hypotheses 2 and 3, there was a consistent trend of no variables being statistically significant. It can be concluded that neither hypothesis 2, stating that smaller companies are more likely to engage in upward biasing, nor hypothesis 3, stating that companies based in more equal societies are less likely to engage in upward biasing, can be confirmed.

One potential explanation for this discrepancy in results and the literature could be that this study focuses primarily on relatively large blue-chip companies within Europe. As such, the effect of size is not as apparent as it would be in a larger and more diverse set of companies. At the same time, these differing results may simply be explained by a difference in attitude where in Europe, aspirational peer groups are less common, or at least are less common in compensation peer groups, as opposed to other types of peer groups like perhaps Total Shareholder Return peer groups.

Furthermore, it is possible that this result is simply due to the limited sample size. As the collection of data for European and global firms is extremely time-consuming due to the non-standard reporting styles across companies in different countries, as well as differing regulations when it comes to what companies need to report and how, it was not possible to collect a larger sample in the time available. As such, it is possible that with a larger sample size, the effects hypothesized in hypotheses 2 and 3 would have been measurable.

### ***Additional analysis***

As previously shown in Table 5, there are large differences between CEO compensation packages of named peers in the US and those either named as peers or included in the index

located outside of the US. This raises the question of whether the upward biases found in the earlier results remain persistent when excluding named peers based in the US.

In the scenario where US peers are ignored, as can be seen in Table 14, we see that the t-values drop substantially, and as can be read from the corresponding p-values, the effect seen previously is no longer statistically significant. While the mean percentage difference between peer and own CEO compensation is still positive, showcasing that perhaps some level of bias still persists, this is outside of the realms of statistical significance, and as such, this indicates that the previously found effect may be largely driven by the inclusion of US peers. While this does not necessarily showcase that US CEOs are overpaid compared to CEOs from other countries, as this is not a random sample, and these peers were picked by the companies included in the index to be used as peers, it does showcase a clear trend of CEOs from the US, at least within our sample having relatively large compensation packages.

**Table 14. One-sample t-test for differences between own and peer CEO compensation, excluding US peers**

	Obs	Mean	St Err	t-value	p-value
Compensation Difference	38	-934.95	632.00	-1.48	.9262
Compensation Difference %	38	.09	0.09	1.07	.1463
Biased/unbiased	38	.42	0.08	-.48	.6837

Regarding the models then, as can be seen in Table 15 below, in the model version where we look at the absolute differences, we see similar results compared to earlier models, as none of the coefficients are statistically significant. The effect of the gini-coefficient remains quite large, but this is likely due to the range being very small, as indicated previously, and it appears that company size and country income inequality do not have any effect on the absolute difference between own and peer CEO compensation. In line with that, the f-statistic of 1.51 for both variables in the combined model is also statistically insignificant.

**Table 15. Effect of company size and country inequality on own-versus-peer compensation when excluding US peers.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	-5.84 (6.90)		-9.09 (7.11)
Gini-coefficient (ln)		-9,740.32 (8,340.80)	-13,098.56 (8,675.00)
Constant	-188.99 (1,084.99)	-12,254.45 (9,713.47)	-14,996.47 (9,864.59)
Observations	38	38	38
R-squared	0.02	0.04	0.08

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Similarly, as can be seen in Table 16 below, also the variant of the model where the percentage difference, as opposed to the absolute difference, is regressed on the market capitalization and the gini-coefficient, we see a similar result. None of the effects in any of the 3 models are significant, and the coefficients are actually quite close to zero. In line with this, we also see a fairly low f-statistic of 1.04 for the two variables in the combined model. All of this indicates that neither market capitalization or company size nor the gini-coefficient or income inequality has any effect on the relative level of upward biasing seen in the compensation of peer CEOs when excluding US peers.

**Table 16. Effect of company size and country inequality on own-versus-peer compensation denoted in percentages relative to own CEO total compensation excluding US peers.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	-0.00 (0.00)		-0.00 (0.00)
Gini-coefficient (ln)		-0.15 (1.14)	-0.66 (1.18)
Constant	0.25* (0.14)	-0.08 (1.33)	-0.50 (1.35)
Observations	38	38	38
R-squared	0.05	0.00	0.06

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Finally, in the biased/unbiased dummy variant of the three models where US peers are excluded, as can be seen in Table 17 below, we see a similar trend as we have seen in the previous models. None of the effects appear to have any statistical significance, and also the f-statistic of 0.66 corresponding to the market cap and the gini-coefficient effects showcases no joint significance of the two variables.

**Table 17. Effect of company size and country inequality on odds of bias occurring excluding US peers.**

Variables	(1) Market Cap	(2) Inequality	(3) Combined
Market Cap	-0.00 (0.00)		-0.00 (0.00)
Gini-coefficient (ln)		-0.32 (1.09)	-0.70 (1.14)
Constant	0.53*** (0.14)	0.05 (1.27)	-0.27 (1.30)
Observations	38	38	38
R-squared	0.03	0.00	0.04

Market cap is measured in billions of euros. Gini-coefficient is measured in its natural logarithm.

Standard errors in parentheses

Stars denote significance:

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In conclusion, while the removal of US peers leads to a reduction in the occurrence and strength of upwardly biased peer groups, it does not appear to change any of the effects regarding market capitalization or gini-coefficient across the models. While I cannot draw clear conclusions from this finding, as I had no prior hypothesis regarding it, it may be an interesting avenue for future research and may potentially even suggest that regulation surrounding the inclusion of US peers may be beneficial when it comes to reducing income inequality and upwards biasing. Naturally, policymakers should tread carefully however, as for example, a ban on using US companies as benchmarking peers may significantly hurt the competitiveness of companies within the country where such legislation would apply.

## Discussion and Conclusion

### *Summary of main findings*

This paper addressed the question: “Does upward biasing of benchmarking peer groups also occur in Europe, and if so, to what extent?” Furthermore, it asked whether any potential biasing in peer groups is at least in part driven by company size or aspirational benchmarking and whether differences in societal characteristics like income inequality are also related to upward biasing within Europe itself.

In the existing literature, it was found that in the United States, there is a problem of upward biasing of compensation benchmarking peer groups in order to extract rent for the CEO (Faulkender & Yang, 2010; Laschever, 2013; Shin, 2013; De Vaan et al., 2018; Audia et al., 2021; Schneider, 2021; Frye et al., 2024). CEOs are often able to influence the peers that a company benchmarks their compensation package against, resulting in a peer group consisting of higher-than-own CEO compensation packages and increases in compensation for the focal CEO over time. This problem of upwardly biased peer groups occurs more commonly when the CEO

is highly powerful (Faulkender & Yang, 2010; Frydman & Jenter, 2010; Laschever, 2013; Shin, 2013; De Vaan et al., 2018; Audia et al., 2021; Schneider, 2021), when the company is smaller and may want to signal great ambitions by choosing aspirational peers (Schneider, 2021), and when companies are performing poorly and are not meeting their targets (De Vaan et al., 2018). Furthermore, literature from China finds evidence for asymmetric pay-for-performance sensitivity where good performance is rewarded, but worse performance is not equally punished in regard to compensation (Lu et al., 2016). Within Europe, the issue of upwardly biased peer groups had not yet been addressed by the literature, while there are reasons to expect it may differ from the United States, as, for example, compensation packages are higher in the US (Conyon & Murphy, 2000; Conyon & Schwalbach, 2000; Owen et al., 2006), and attitudes towards equality and fairness differ substantially (Alesina et al., 2001).

By utilizing the STOXX Europe 50 index as a proxy for European blue-chip companies, I manually collect data on total CEO compensation and compensation peer groups for the indexed companies. After collecting total CEO compensation data for all companies both in the index and named as a peer, I calculate the average total CEO compensation for all named peers for each company included in the STOXX Europe 50 index that publicly discloses its compensation benchmarking peers and calculate the difference between the average total CEO compensation of named peers and the CEO compensation of the focal company. By running various t-tests comparing both CEO compensation and the average CEO compensation of named peers, I find that in line with hypothesis 1 also in Europe companies have a tendency to benchmark against upwardly biased peer groups. This effect is statistically significant at the 5% level and is large in size as the total CEO compensation of peers is, on average, 2 million euros higher compared to the focal CEO; the average compensation is in expectation 48% higher than the compensation package of the focal CEO, and 63% of companies have a peer group whose compensation packages are at least 10% higher than that of the firm. Furthermore, I utilize extensive regression analysis, regressing the difference between own and peer CEO compensation, the relative percentage difference in compensation, and a binary biased/unbiased variable on both market capitalization (as a proxy for company size) and the natural logarithm of gini-coefficient (as a proxy for fairness and equality) as well as a combined multiple regression model including the two variables. I conclude that hypothesis 2, stating that smaller companies have a higher likelihood of upwardly biasing their peer group, can not be confirmed as market capitalization does not appear to have any statistically significant effect relating to the size of the difference between own and peer total CEO compensation. Additionally, hypothesis 3 stating that more companies based in more equal societies have a lower likelihood of utilizing upwardly biased peer groups, can similarly not be confirmed, as the effects found do not appear to be statistically significant. I explain these findings through the research design being focused primarily on larger companies in regards to hypothesis 2, and additionally having a fairly low sample size. While it is impossible to say whether the effects found under a larger sample size would have been different, it remains an interesting question for future research.



Finally, as I find that within my sample peers from the United States tend to have relatively large compensation packages, I repeat the analysis outlined above while ignoring US peers as a means of additional exploratory analysis. I find that upon removal of US peers, upward bias is diminished, while results surrounding hypotheses 2 and 3 remain unchanged. While this is not directly linked to any hypotheses or existing literature, so that strong conclusions cannot be drawn, it may be an avenue of more comprehensive future research and may additionally have interesting implications for policymakers.

### ***Conclusions and main implications***

Consequently, this paper provides the following key insights: like what was found in several US studies (De Vaan et al., 2018; Faulkender & Yang, 2010; Laschever, 2013; Schneider, 2021; Shin, 2013), European companies similarly appear to engage in upward biasing of peer groups used to benchmark CEO compensation. This means that European companies, like their US counterparts, appear to select their peers strategically to have higher-than-own CEO compensation, likely in an attempt to extract more rent for their CEO over time.

Furthermore, it appears that company size, measured in this study through market capitalization, does not appear to have any statistically significant effect on the upward biasing of peer groups, unlike what Schneider (2021) found to be the case for US companies. That is to say that European companies, unlike their American counterparts, do not appear to be affected by company size when it comes to the occurrence or severity of upward biasing of peer groups. While the reason for this discrepancy remains a source for future research, I potentially explain these results by the fact that the companies included in this analysis are all relatively large companies within the European market, so that perhaps the effect of company size can not be properly measured.

Additionally, the relation between the level of inequality of the country in which a company is listed does not appear to have any statistically significant effect on the level of bias in compensation peer groups. While the lack of this effect may be caused by the small sample size, this result may indicate that neither fairness nor equality considerations are of large importance for large European companies when it comes to choosing their peers for the purposes of compensation benchmarking.

Moreover, as upon the removal of named US peers the effect of upward biasing is diminished, this effect may be largely driven by the inclusion of US companies, or at least those US companies named as peers having large CEO compensation packages. While this finding is part of additional exploratory analysis and therefore lacks supporting literature, it may be an avenue

for future research or even policymakers in regard to regulation on how companies are supposed to benchmark their compensation.

Finally, both due to the results found when it comes to the prevalence of biased peer groups, as well as the fact that certain companies included in this study did not publicly disclose the companies that they used for the purpose of compensation benchmarking, I believe this is a point to look at for policymakers within Europe, or particularly the EU. This is because mandatory disclosure may curb excessive CEO compensation packages like showcased by Johnson (2021), who found that mandated disclosure of CEO-to-employee ratio for US companies led to a curb in CEO pay, particularly for companies more sensitive to reputation effects. Furthermore, as was shown by Jiang et al. (2016), forced disclosure may result in overpaid CEOs receiving less pay raises and comparatively underpaid ones more, resulting in fairer compensation.

### ***Limitations and future research***

While this paper addresses issues brought up by Cadman & Carter (2014) regarding leaving out smaller peers from the analysis, resulting in biased data, it could not avoid other issues due to the paper being focused on European companies and European data. As disclosing (specific) peers is not mandated in all European countries, peers could only be collected for 38 out of 50 companies included in the STOXX Europe 50 index. As such, it is certainly possible that the companies that are not included in this analysis have comparatively more or less biased peer groups. For example, a company might decide not to disclose specific peers if the executive board or the compensation committee is aware that the peers they are benchmarking against are upwardly biased in order to escape controversy. Or on the contrary, companies may decide not to disclose peers simply due to it not being required or precisely due to having lower than market total compensation, which is something they do not want to signal to outside talent that may potentially become future hires.

Additionally, a clear limitation of this study is the limited sample size. While a sample size of 38 is enough to satisfy the assumption of normality required for statistical validity, it is still leaning on the lower end of the minimum sample size required to meet that requirement. The reason for this limited sample size is both that some companies in the index do not publicly disclose their peers, as well as a limit in time and other resources available. Naturally, this is a clear area where future research can continue to fill gaps as a study including a much larger sample size, like for instance, by using the STOXX Europe 600 index or an even larger index representing the European market as opposed to the STOXX Europe 50 index used in this study.

Another area this research design is unable to tackle is a problem that arises due to some companies having multiple peer groups that they compare their compensation package against. In this research design, each named peer is seen as equally important. This is because the resulting peer CEO compensation package is derived from the average of the compensation

packages of all named peers. However, in actuality, companies may in some instances compare their compensation package to the average of three different peer groups like e.g., local peers, industry peers, and global peers, which do not necessarily have to be equal in size when it comes to the amount of peers named per group. Furthermore, companies may look at three differing peer groups as just described but pay primary attention to just one of the groups. Assuming in that case that this primary peer group would be global peers, this study and its design would likely showcase a lower amount of upward biasing compared to what is occurring in actuality, whereas on the contrary, if the primary peer group of interest is local peers, this study would actually showcase a higher amount of upwardly biasing as opposed to again, what is occurring in actuality. This is an issue that is extremely difficult to tackle without some sort of international regulation that requires companies to outline specifically and in great detail how they arrive at their compensation packages from benchmarking.

When it comes to areas of future research, a study with a greater sample size would be interesting, not only to see whether the same conclusion that European companies are upwardly biasing their peer groups is reached but also to identify with greater certainty whether company size and the company country's fairness considerations do or do not have any effect. It should be noted that unlike previous studies conducted on US data, European filings are not nearly as standardized as there are large differences in reporting not only from country to country but also between different companies within the same country. As such, it is difficult, at least currently, to utilize artificial intelligence or other algorithms reliably in order to scrape the data, so that it becomes a highly time-consuming task.

Furthermore, an interesting angle for future research, especially if regulation changes so that companies are forced to disclose their peer groups, is to look into the nature of peer groups of companies that currently do not (explicitly) disclose them. It would be interesting to know what kind of peer groups these companies use and whether they are or are not upwardly biased, specifically for companies that disclose that they utilize peer group benchmarking and describe certain aspects of companies that are used for the purposes of benchmarking but do not state the specific companies used for their benchmarking purposes by name.

Additionally, the positive effect of CEO power on upwards compensation benchmarking, as found in American companies by De Vaan et al. (2018) and Audia et al. (2021), is something that ought to be researched within Europe and European companies as well. As powerful CEOs are more likely to be able to influence the peer group their company uses for the purpose of compensation benchmarking. It is possible that, like their US counterparts, European companies similarly suffer from increased upward biasing of peer groups as a result of powerful CEOs.

Finally, more regional research in the area of compensation could be extremely interesting. Outside of the United States and some research in China, compensation benchmarking is a topic

that is quite under-researched. As such, a study on compensation benchmarking, the occurrence of bias, and its effectiveness within the continent of Asia would greatly contribute to the existing research. Furthermore, a regional comparison, for example, comparing directly compensation benchmarking and the occurrence of upward biasing in the US to that in Europe to see if there are differences in severity of bias or how commonly it occurs in both regions could fill another gap in the literature.

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