

MEMORANDUM

TO: File

FROM: Division of Economic and Risk Analysis¹

SUBJECT: Extension of the analysis of the potential effect on pay ratio disclosure of exclusion of different percentages of employees at a range of thresholds

DATE: June 30, 2015

With regard to the memorandum posted on the Commission's website as part of the comment file on June 4th, 2015, Staff from the Division of Economic and Risk Analysis has extended in the following three ways the analysis contained in that memorandum, which considers the potential effect of excluding different percentages of employees on the pay ratio calculation.²

- (1) In the original analysis, Staff considered the exclusion of different percentages of employees. Table 1 of the memorandum showed the effects on the median of the intra-firm pay distribution of excluding up to 20% of employees (by 1% increments). Below we extend that table to show the effects of excluding percentages greater than 20%, and up to 95% (by 5% increments).
- (2) In the original analysis, Staff considered the exclusion of different percentages of employees under two scenarios: Scenario I (all excluded observations are below the median) and Scenario II (all excluded observations are above the median). Below we extend Table 1 to show the effects of excluding percentages of employees under three intermediate scenarios: Scenario I(a) (75% of the excluded observations are below the median, with the remaining 25% of the excluded observations above the median); Scenario I(b) (50% of the excluded observations are below the median, with the remaining 50% of the excluded observations above the median); and Scenario I(c) (75% of the excluded observations are above the median, with the remaining 25% of the excluded observations below the median).³
- (3) In the original analysis, we presented the estimated effects using only one decimal place in Table 1 and showed only one combined figure for all four standard deviation estimates (*i.e.*, sigma equal to 0.25, 0.35, 0.45, or 0.55), which are based on prior studies. Below, in reporting the effects originally estimated and now extended, we use two decimal places in the tables and present a separate figure for each of the four standard deviation estimates.

¹ This is a memo by the Staff of the Division of Economic and Risk Analysis of the U.S. Securities and Exchange Commission. The Commission has expressed no view regarding the analysis, findings, or conclusions contained herein.

² The analysis is derived from the information in the posted memo and uses the same methodological approach described in that memo.

³ For tractability, we assume that the excluded percentages are away from the median. The exclusion of observations around the median may have a different effect, with the effect depending on the exact exclusion criteria and identification of the median worker.

In extending the analysis of the potential effects on the pay ratio disclosure, we followed the same methodology and assumptions as presented in the memorandum. In particular, we continue to assume that the intra-firm distribution of pay is described by a lognormal distribution. All of the caveats specified in the memorandum apply to the interpretation of the estimated effects presented below. Given the assumptions made, we note that these extensions are in line with the original analysis in the memorandum and yield estimates of the effects that are in the expected range. In particular, the estimates of the effect on the median pay and thus on the pay ratio calculation increase in magnitude as greater percentages of employees are excluded from the distribution.⁴

Also, as specified in the memorandum, Scenarios I and II can be regarded as lower- and upper-bound scenarios, respectively, under the assumptions made. If some excluded observations are above and some are below the median for the underlying distribution, the effect will be in the range between Scenarios I and II. The extension of the original analysis to include intermediate scenarios (Scenarios I(a), I(b), and I(c)) yields effects within the range delineated by Scenarios I and II, with Scenario I(b) predictably yielding no estimated effect.

Finally, we note that, if the intra-firm distribution of pay at an affected registrant deviates from our lognormal assumption, estimates of the effects under Scenarios I, I(a), I(c), and II may correspondingly decrease in accuracy as the percentage of the excluded observations increases.

⁴ Except in Scenario I(b), where the estimated effect is zero regardless of the percentage of employees excluded from the distribution because observations are equally excluded from either side of the median.

Table 2a. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios (standard deviation, sigma=0.25)

Scenario Percentage threshold	I	I(a)	I(b)	I(c)	II
0%	0.00%	0.00%	0.00%	0.00%	0.00%
1%	-0.31%	-0.16%	0.00%	0.16%	0.31%
2%	-0.62%	-0.31%	0.00%	0.31%	0.63%
3%	-0.94%	-0.47%	0.00%	0.47%	0.94%
4%	-1.25%	-0.62%	0.00%	0.63%	1.26%
5%	-1.56%	-0.78%	0.00%	0.79%	1.58%
6%	-1.86%	-0.94%	0.00%	0.94%	1.90%
7%	-2.17%	-1.09%	0.00%	1.10%	2.22%
8%	-2.48%	-1.25%	0.00%	1.26%	2.54%
9%	-2.79%	-1.40%	0.00%	1.42%	2.87%
10%	-3.09%	-1.56%	0.00%	1.58%	3.19%
11%	-3.40%	-1.71%	0.00%	1.74%	3.52%
12%	-3.70%	-1.86%	0.00%	1.90%	3.85%
13%	-4.01%	-2.02%	0.00%	2.06%	4.18%
14%	-4.31%	-2.17%	0.00%	2.22%	4.51%
15%	-4.62%	-2.33%	0.00%	2.38%	4.84%
16%	-4.92%	-2.48%	0.00%	2.54%	5.18%
17%	-5.23%	-2.63%	0.00%	2.70%	5.51%
18%	-5.53%	-2.79%	0.00%	2.87%	5.85%
19%	-5.83%	-2.94%	0.00%	3.03%	6.19%
20%	-6.14%	-3.09%	0.00%	3.19%	6.54%
25%	-7.66%	-3.86%	0.00%	4.01%	8.29%
30%	-9.18%	-4.62%	0.00%	4.84%	10.11%
35%	-10.72%	-5.38%	0.00%	5.68%	12.01%
40%	-12.29%	-6.14%	0.00%	6.54%	14.01%
45%	-13.88%	-6.90%	0.00%	7.41%	16.12%
50%	-15.52%	-7.66%	0.00%	8.29%	18.37%
55%	-17.21%	-8.42%	0.00%	9.19%	20.79%
60%	-18.97%	-9.18%	0.00%	10.11%	23.42%
65%	-20.84%	-9.95%	0.00%	11.05%	26.32%
70%	-22.83%	-10.72%	0.00%	12.01%	29.58%
75%	-24.99%	-11.50%	0.00%	13.00%	33.32%
80%	-27.41%	-12.29%	0.00%	14.01%	37.77%
85%	-30.22%	-13.08%	0.00%	15.05%	43.32%
90%	-33.72%	-13.88%	0.00%	16.12%	50.86%
95%	-38.74%	-14.69%	0.00%	17.22%	63.23%

Table 2b. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios (standard deviation, sigma=0.35)

Scenario Percentage threshold	I	I(a)	I(b)	I(c)	II
0%	0.00%	0.00%	0.00%	0.00%	0.00%
1%	-0.44%	-0.22%	0.00%	0.22%	0.44%
2%	-0.87%	-0.44%	0.00%	0.44%	0.88%
3%	-1.31%	-0.66%	0.00%	0.66%	1.32%
4%	-1.74%	-0.87%	0.00%	0.88%	1.77%
5%	-2.17%	-1.09%	0.00%	1.10%	2.22%
6%	-2.60%	-1.31%	0.00%	1.32%	2.67%
7%	-3.03%	-1.52%	0.00%	1.55%	3.12%
8%	-3.45%	-1.74%	0.00%	1.77%	3.58%
9%	-3.88%	-1.96%	0.00%	1.99%	4.04%
10%	-4.30%	-2.17%	0.00%	2.22%	4.50%
11%	-4.73%	-2.39%	0.00%	2.44%	4.96%
12%	-5.15%	-2.60%	0.00%	2.67%	5.43%
13%	-5.57%	-2.81%	0.00%	2.90%	5.90%
14%	-5.99%	-3.03%	0.00%	3.12%	6.37%
15%	-6.40%	-3.24%	0.00%	3.35%	6.84%
16%	-6.82%	-3.45%	0.00%	3.58%	7.32%
17%	-7.24%	-3.67%	0.00%	3.81%	7.80%
18%	-7.66%	-3.88%	0.00%	4.04%	8.29%
19%	-8.07%	-4.09%	0.00%	4.27%	8.78%
20%	-8.49%	-4.30%	0.00%	4.50%	9.27%
25%	-10.55%	-5.36%	0.00%	5.66%	11.80%
30%	-12.62%	-6.40%	0.00%	6.84%	14.44%
35%	-14.68%	-7.45%	0.00%	8.05%	17.21%
40%	-16.77%	-8.49%	0.00%	9.27%	20.15%
45%	-18.88%	-9.52%	0.00%	10.52%	23.27%
50%	-21.03%	-10.55%	0.00%	11.80%	26.63%
55%	-23.23%	-11.58%	0.00%	13.10%	30.26%
60%	-25.51%	-12.62%	0.00%	14.44%	34.25%
65%	-27.90%	-13.65%	0.00%	15.81%	38.69%
70%	-30.42%	-14.68%	0.00%	17.21%	43.73%
75%	-33.14%	-15.72%	0.00%	18.66%	49.57%
80%	-36.14%	-16.77%	0.00%	20.15%	56.60%
85%	-39.58%	-17.82%	0.00%	21.68%	65.51%
90%	-43.77%	-18.88%	0.00%	23.27%	77.84%
95%	-49.64%	-19.95%	0.00%	24.92%	98.57%

Table 2c. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios (standard deviation, sigma=0.45)

Scenario Percentage threshold	I	I(a)	I(b)	I(c)	II
0%	0.00%	0.00%	0.00%	0.00%	0.00%
1%	-0.56%	-0.28%	0.00%	0.28%	0.57%
2%	-1.12%	-0.56%	0.00%	0.57%	1.13%
3%	-1.68%	-0.84%	0.00%	0.85%	1.71%
4%	-2.23%	-1.12%	0.00%	1.13%	2.28%
5%	-2.78%	-1.40%	0.00%	1.42%	2.86%
6%	-3.33%	-1.68%	0.00%	1.71%	3.45%
7%	-3.88%	-1.96%	0.00%	1.99%	4.03%
8%	-4.42%	-2.23%	0.00%	2.28%	4.62%
9%	-4.96%	-2.51%	0.00%	2.57%	5.22%
10%	-5.50%	-2.78%	0.00%	2.86%	5.82%
11%	-6.03%	-3.06%	0.00%	3.15%	6.42%
12%	-6.57%	-3.33%	0.00%	3.45%	7.03%
13%	-7.10%	-3.60%	0.00%	3.74%	7.64%
14%	-7.63%	-3.88%	0.00%	4.03%	8.26%
15%	-8.16%	-4.15%	0.00%	4.33%	8.88%
16%	-8.68%	-4.42%	0.00%	4.62%	9.51%
17%	-9.21%	-4.69%	0.00%	4.92%	10.14%
18%	-9.73%	-4.96%	0.00%	5.22%	10.78%
19%	-10.25%	-5.23%	0.00%	5.52%	11.43%
20%	-10.77%	-5.50%	0.00%	5.82%	12.08%
25%	-13.36%	-6.83%	0.00%	7.34%	15.42%
30%	-15.92%	-8.16%	0.00%	8.88%	18.93%
35%	-18.47%	-9.47%	0.00%	10.46%	22.65%
40%	-21.02%	-10.77%	0.00%	12.08%	26.61%
45%	-23.59%	-12.07%	0.00%	13.73%	30.86%
50%	-26.18%	-13.36%	0.00%	15.42%	35.46%
55%	-28.82%	-14.64%	0.00%	17.15%	40.49%
60%	-31.53%	-15.92%	0.00%	18.93%	46.04%
65%	-34.33%	-17.20%	0.00%	20.77%	52.28%
70%	-37.27%	-18.47%	0.00%	22.65%	59.42%
75%	-40.41%	-19.74%	0.00%	24.60%	67.81%
80%	-43.82%	-21.02%	0.00%	26.61%	78.02%
85%	-47.68%	-22.30%	0.00%	28.70%	91.13%
90%	-52.30%	-23.59%	0.00%	30.86%	109.63%
95%	-58.60%	-24.88%	0.00%	33.12%	141.57%

Table 2d. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios (standard deviation, sigma=0.55)

Scenario Percentage threshold	I	I(a)	I(b)	I(c)	II
0%	0.00%	0.00%	0.00%	0.00%	0.00%
1%	-0.69%	-0.34%	0.00%	0.35%	0.69%
2%	-1.37%	-0.69%	0.00%	0.69%	1.39%
3%	-2.05%	-1.03%	0.00%	1.04%	2.09%
4%	-2.72%	-1.37%	0.00%	1.39%	2.80%
5%	-3.39%	-1.71%	0.00%	1.74%	3.51%
6%	-4.06%	-2.05%	0.00%	2.09%	4.23%
7%	-4.72%	-2.38%	0.00%	2.44%	4.95%
8%	-5.37%	-2.72%	0.00%	2.80%	5.68%
9%	-6.03%	-3.06%	0.00%	3.15%	6.41%
10%	-6.68%	-3.39%	0.00%	3.51%	7.16%
11%	-7.32%	-3.72%	0.00%	3.87%	7.90%
12%	-7.97%	-4.06%	0.00%	4.23%	8.66%
13%	-8.61%	-4.39%	0.00%	4.59%	9.42%
14%	-9.24%	-4.72%	0.00%	4.95%	10.19%
15%	-9.88%	-5.05%	0.00%	5.31%	10.96%
16%	-10.51%	-5.37%	0.00%	5.68%	11.74%
17%	-11.14%	-5.70%	0.00%	6.05%	12.53%
18%	-11.76%	-6.03%	0.00%	6.41%	13.33%
19%	-12.39%	-6.35%	0.00%	6.78%	14.14%
20%	-13.01%	-6.68%	0.00%	7.16%	14.95%
25%	-16.08%	-8.29%	0.00%	9.04%	19.15%
30%	-19.10%	-9.88%	0.00%	10.96%	23.61%
35%	-22.09%	-11.45%	0.00%	12.93%	28.35%
40%	-25.06%	-13.01%	0.00%	14.95%	33.43%
45%	-28.02%	-14.55%	0.00%	17.02%	38.93%
50%	-30.99%	-16.08%	0.00%	19.15%	44.91%
55%	-34.00%	-17.59%	0.00%	21.35%	51.51%
60%	-37.05%	-19.10%	0.00%	23.61%	58.87%
65%	-40.19%	-20.60%	0.00%	25.94%	67.20%
70%	-43.45%	-22.09%	0.00%	28.35%	76.83%
75%	-46.88%	-23.57%	0.00%	30.84%	88.27%
80%	-50.58%	-25.06%	0.00%	33.43%	102.35%
85%	-54.69%	-26.54%	0.00%	36.12%	120.72%
90%	-59.53%	-28.02%	0.00%	38.93%	147.11%
95%	-65.97%	-29.50%	0.00%	41.85%	193.87%

Figure 2a. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios and assumptions, sigma=0.25

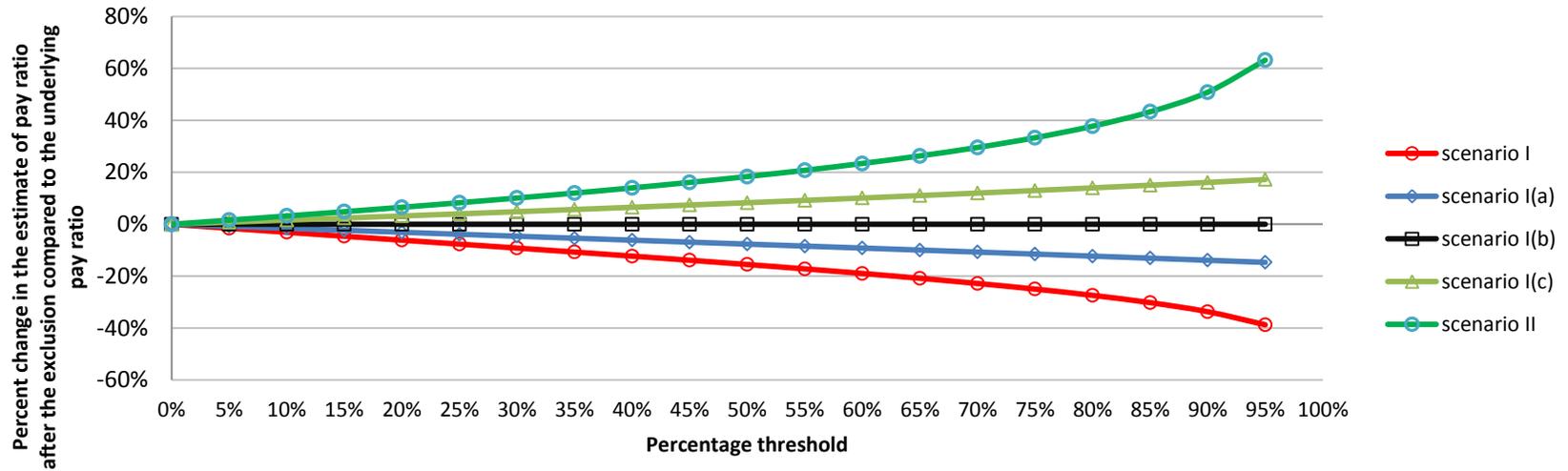


Figure 2b. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios and assumptions, sigma=0.35

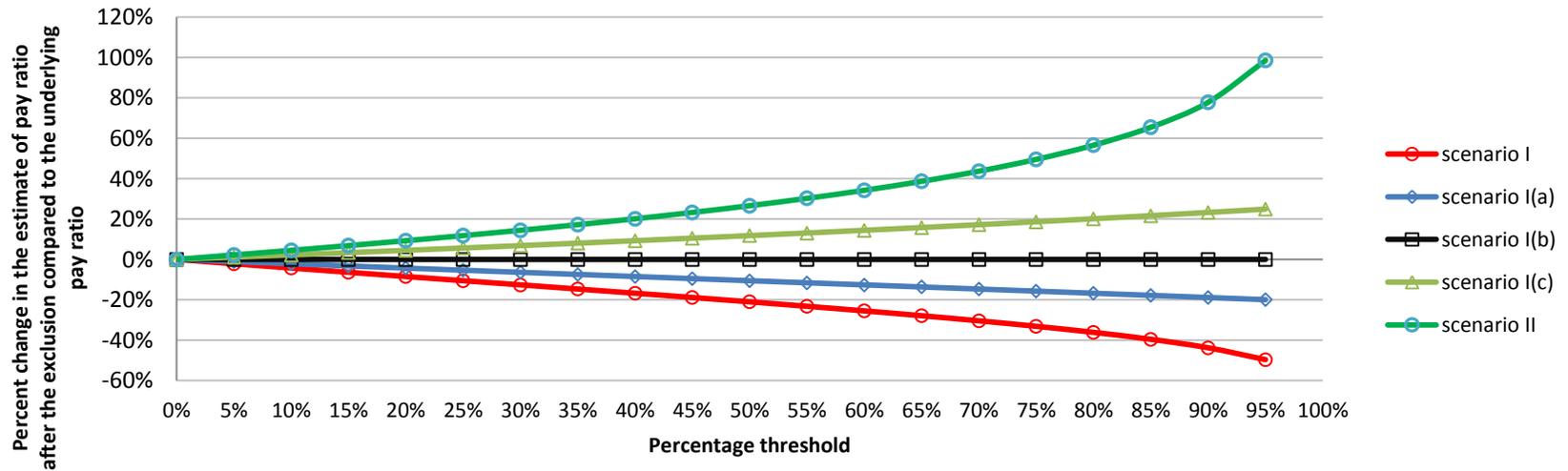


Figure 2c. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios and assumptions, sigma=0.45

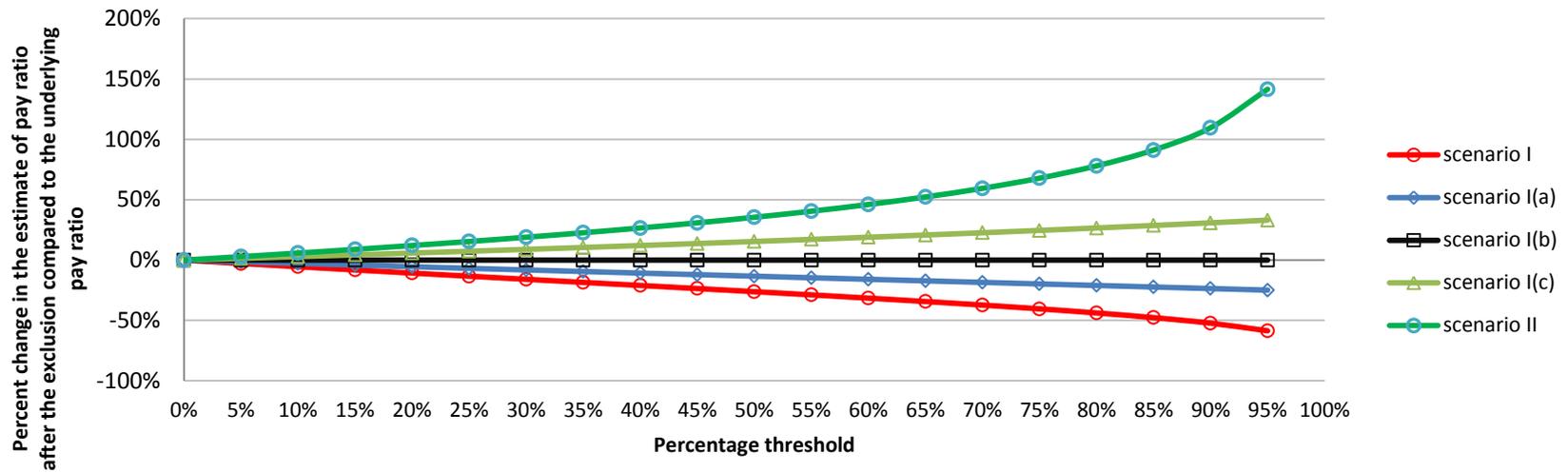


Figure 2d. Potential effects on the pay ratio of the exclusion of various percentages of employees under additional alternative scenarios and assumptions, sigma=0.55

