

## Pay Rate Differentials

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**[Abstract]** Salary compression between job levels and across industries is analyzed utilizing 25,000 plus responses to a popular management blog. The analysis finds that salary compression between job levels differs by industry. Low levels of salary compression are characterized by bureaucratic industries and those dominated by small businesses. High salary compression is found in capital intense industries and those with strong manual labor components. The findings of this study provide useful information for those interested in salary compression.

**[Keywords]** pay disparity, salary, naics, salary progression

### Introduction

There is a growing concern in society regarding pay disparity between mid- to lower-level employees and upper-level management. For instance, despite underestimating CEO earnings, the vast majority of individuals believe that CEOs are significantly overpaid (Larcker et al., 2016). This is particularly true in the United States, where the pay disparity has resulted in “extreme income inequality” and presents an “empirical puzzle” for researchers (Tsui et al., 2019, p. 463). The recent COVID-19 pandemic has exacerbated this disparity with individuals such as Jeff Bezos (Amazon) and Elon Musk (Tesla) reaching an estimated growth of \$158 billion during the pandemic, while large swaths of the population struggle to pay rent and meet basic needs. Aligning with the societal conversation surrounding pay disparity, researchers have called for additional research into this area (e.g., Tsui et al., 2019), while simultaneously noting the lack of data to compare upper management to employee pay ratios (Alan et al., 2020).

To address this call, we provide a broad empirical review of pay dispersion across 20 industries as identified by the NAICS. Using over 23,565 self-reported earnings from individuals participating in an online survey, we offer a rare glimpse into pay dispersion across numerous industries and four occupational levels (staff, management, directors, and executives) within the United States. In doing so, we provide a valuable resource to researchers investigating pay dispersion by identifying what industries demonstrate steep or flat pay steps between levels. Along with this contribution, we also propose potential avenues for future research for how to best utilize the descriptive data reported in this study.

### Research Methodology

#### *Data Source*

Askamanager.org is a management blog run by Allison Green. The blog has been active since 2007 and has a large following. A frequent topic of the blog is occupational salaries. In 2019, the blog hosted a salary survey that collected 30,261 respondents. The survey included questions on respondent age, industry, job title, annual salary, location, and experience. A copy of the data was obtained in June 2019, with the permission of Allison Green, for the purpose of research analysis.

#### *Manipulation*

Not all 30,261 observations were usable, and the data required extensive review before it could be analyzed. Initial cleanup involved the following: Age was captured as one of seven ranked categories. This variable was converted to a single value by averaging the endpoints of the categories for each response. Industry type was captured as a text response. Responses were reviewed and converted to comparable three-digit NAICS code. Job title was captured as a text response. Responses were reviewed and categorized into four

levels, staff, manager, director and executive. Annual compensation was captured as a text response with a select box for currency. All values were converted to numeric values in US dollars. Location information was captured with a text response. This was converted to country and (for the US) state values. Professional experience was captured as one of eight ordered variables. This was converted to a single numeric value by averaging the endpoints of the categories.

After a preliminary review, it was apparent that not all the data was useable. For instance, some respondents claimed more experience than was possible given their age. Further, the original data set contained responses from around the world. However, the main concentration was in the U.S. as the blog is written from a U.S. perspective and in English. After data cleaning and restricting the geography to the U.S. 23,565 observations remained.

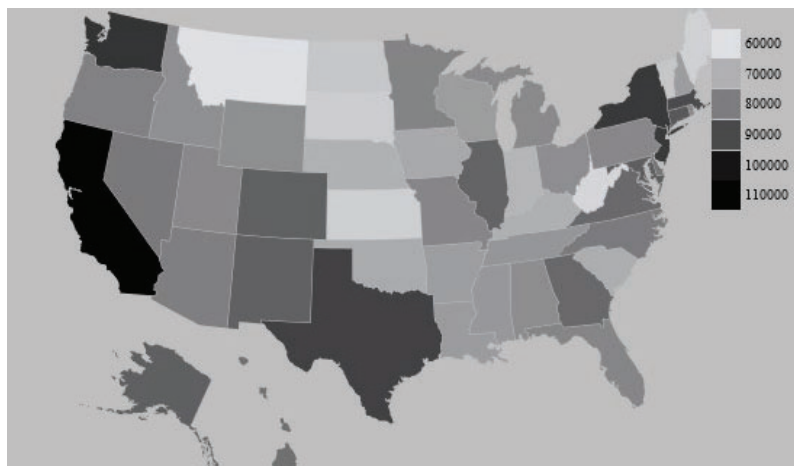
### Descriptive Analysis

Responses were concentrated in 28 industry categories with the top seven industry categories making up 79.1% of total responses as follows:

*Table 1*  
*The Top Seven Industries in the Data Set Along with the Sample Size of Each*

NAICS	Industry	n	% of Total	Running Total
54	Professional, Scientific, and Technical Services	6,751	28.9%	28.9%
81	Other Services (except Public Administration)	3,596	15.4%	44.3%
61	Educational Services	2,781	11.9%	56.3%
62	Health Care and Social Assistance	1,719	7.3%	63.6%
52	Finance and Insurance	1,628	7.0%	70.5%
51	Information	1,185	5.1%	75.6%
32	Manufacturing (Wood & Chemical)	809	3.5%	79.1%

Responses were unevenly distributed across the U.S., but generally followed the GDP contribution by state. As can be seen in the following heat map, strong responses came from California, Washington, Texas, New York, and New Jersey. However, the overall geography of the US was well represented.



*Figure 1*  
 A State-by-State Breakdown of the Number of Responses

Across all responses, annual compensation averaged \$86,590 with an average experience of 12.3 years and an average age of 37.1. Given the internet nature of the blog medium, the overall sample can be considered young but clearly in their prime working years. There were clear experience and age differences between the categorical job levels.

*Table 2*  
*Average Experience and Ages for the US*

	<b>Staff</b>	<b>Managers</b>	<b>Directors</b>	<b>Executive</b>
Avg. Experience	11.1	12.9	14.8	18.4
Avg. Age	36	37	39	44

The top three highest compensated industry categories on average were as follows:

- \$115,044 Mining, Quarrying and Oil and Gas Extraction - NAICS 21
- \$110,177 Utilities - NAIC 22
- \$106,669 Manufacturing (Metal & Other) - NAIC 33

The bottom three lowest compensated industry categories on average were as follows:

- \$65,538 Manufacturing Electronic and Other Electrical Equipment and Components, Except Computer Equipment – NAICS 36 (low number of observations)
- \$66,264 Educational Services – NAICS 61
- \$67,666 Health Services – NAICS 80 (low number of observations)

The complete list of average compensation by category follows:

*Table 3*  
*Average Salary and Experience by NAICS Code*

<b>NAICS</b>	<b>Industry</b>	<b>n</b>	<b>Avg. Age</b>	<b>Avg. Experience</b>	<b>Avg. Salary</b>
54	Professional, Scientific, and Technical Services	6,751	36.1	11.7	\$ 99,509
81	Other Services (except Public Administration)	3,596	36.6	12.0	\$ 76,812
61	Educational Services	2,781	37.7	12.4	\$ 66,264
62	Health Care and Social Assistance	1,719	38.2	12.5	\$ 85,222
52	Finance and Insurance	1,628	37.3	12.8	\$ 93,637
51	Information	1,185	36.7	12.3	\$ 73,741
32	Manufacturing (Wood & Chemical)	826	38.8	13.8	\$ 93,470
33	Manufacturing (Metal & Other)	603	39.5	14.8	\$ 106,669
45	Retail Trade (General & Non Store)	584	36.4	11.5	\$ 75,667
56	Administrative and Support and Waste Management and Remediation Services	562	37.5	12.0	\$ 80,142
92	Public Administration	533	36.8	11.9	\$ 89,660
23	Construction	454	39.2	14.1	\$ 89,119
44	Retail Trade (Specialty)	394	37.5	12.4	\$ 82,749
53	Real Estate and Rental and Leasing	367	37.7	12.9	\$ 91,315

71	Arts, Entertainment, and Recreation	318	34.8	10.1	\$ 68,822
72	Accommodation and Food Services	280	35.6	11.4	\$ 73,740
42	Wholesale Trade	245	39.5	13.3	\$ 92,470
22	Utilities	229	37.2	13.3	\$ 110,177
48	Transportation and Warehousing	214	40.2	14.4	\$ 91,706
31	Manufacturing (Food & Textile)	171	36.0	10.9	\$ 72,693
21	Mining, Quarrying, and Oil and Gas Extraction	166	39.0	13.1	\$ 115,044
11	Agriculture, Forestry, Fishing and Hunting	75	36.7	11.7	\$ 81,139
25	Furniture and Fixtures	28	35.1	11.6	\$ 72,724
87	Engineering, Accounting, Research, Management, and Related Services	18	40.1	12.0	\$ 98,811
49	Transportation and Warehousing	14	35.3	9.1	\$ 69,955
36	Manufacturing Electronic and Other Electrical Equipment and Components, Except Computer Equipment	13	36.4	14.2	\$ 65,538
55	Management of Companies and Enterprises	7	41.7	10.6	\$ 77,714
80	Health Services	3	36.2	6.5	\$ 67,666

### Salary Discount Analysis

Across all responses, staff were compensated an average of \$72,391, Managers were compensated an average of \$97,208, Directors were compensated an average of \$113,456 and Executives were compensated an average of \$121,744.

*Table 4*  
*Average Salaries by Job Category*

	Staff	Managers	Directors	Executive
Avg. Salary	\$ 72,391	\$97,208	\$ 113,456	\$121,744
n	12,464	7,861	2,937	303

These compensation levels can be compared to assess relative compensation discounts. We operationalize “pay disparity” by calculating a “salary discount,” which is the ratio of a lower pay level to a higher level. We see in the following that the Staff average was 74.5% of the Manager average, 63.8% of the Director average and 59.5% of the Executive average.

Since the Executive category is the highest level of average compensation, we compare the relative compression between the ordered categories. Staff are compensated at 59.5% of the Executive level. Managers are compensated at 79.8% of the Executive level and Directors are compensated at 93.2% of the Executive level. Moving from the Staff to the Manager level, the compensation discount decreases by 20.4%. Moving from the Manager to the Director level the discount decreases by 13.3%. Moving from the Manager to the Director level, the discount decreases by 6.8%. Between these categories, assuming managerial responsibility for others has the most impact on annual compensation.

Table 5  
Pay Disparity between Job Levels

	Staff	Managers	Directors	Executive
Staff	1			
Manager	74.5%	1		
Director	63.8%	85.7%	1	
Executive	59.5%	79.8%	93.2%	1

A similar discount analysis can be examined at the industry level. Executive level response was concentrated in six industries. At the Staff level, the greatest discount to the Executive level is seen in NAICS 52, the Finance and Insurance industry. The lowest discount to the Executive level is seen in NAIC 81, Other Services.

Table 6  
Pay Disparity by Industry

Industry	NAICS	Staff	Manager	Director	Executive
Other Services (except Public Administration)	81	72.4%	84.9%	93.8%	100%
Professional, Scientific, and Technical Services	54	59.8%	80.8%	91.8%	100%
Real Estate and Rental and Leasing	53	57.0%	66.6%	91.1%	100%
Educational Services	61	53.3%	61.8%	78.5%	100%
Construction	23	51.4%	61.5%	88.8%	100%
Finance and Insurance	52	46.5%	60.3%	82.0%	100%

Examining the change in the compensation discount between levels is revealing. Within NAICS 61, Educational Services, there is the smallest change from the Staff to the Manager category at 8.5%. However, this is also the category with the largest change from the Director to the Executive category at 21.5%. With an opposite effect in NAICS 54, Professional, Scientific and Technical Services, the jump from Staff to Manager has the highest increase at 21.0%. Meanwhile, the jump from Director to Executive is relatively minor at 8.2%

Table 7  
Pay Increases for Promotions by Industry

Industry	NAICS	Staff to Managers	Manager to Director	Director to Executive
Professional, Scientific and Technical Services	54	21.0%	11.0%	8.2%
Other Services (except Public Administration)	81	12.5%	8.9%	6.2%
Educational Services	61	8.5%	16.7%	21.5%
Finance and Insurance	52	13.8%	21.8%	18.0%
Construction	23	10.1%	27.3%	11.2%
Real Estate and Rental and Leasing	53	9.6%	24.6%	8.9%

A similar analysis can be conducted across all the included industries. However, there are not sufficient Executive level responses to include that level in the analysis. The Director level is used instead. Across all the included industries, the three industries with the highest staff discount to the director level are 49% Manufacturing (Food & Textile) (NAICS 31), 50% Administrative, Support, Waste Management, and Remediation Services (NAICS 56) and 51% Manufacturing (Wood & Chemical) (NAICS 32). The three industries with the lowest staff discount to the director level are 77% Other Services (except Public Administration) (NAICS 81), 73% Public Administration (NAICS 92) and 68% Educational Services (NAICS 61).

Table 8  
Pay Increases for Promotions across all Industries

Industry	NAICS	Staff	Manager	Staff	Manager	Director
		% Manager	\$ Avg Salary	% Dir	% Dir	\$ Avg Salary
Manufacturing (Food & Textile)	31	73%	78,029	49%	67%	116,506
Administrative, Support, Waste Management and Remediation Services	56	69%	89,602	50%	73%	123,430
Manufacturing (Wood & Chemical)	32	80%	96,249	51%	64%	149,276
Retail Trade (Specialty)	44	72%	94,161	53%	74%	127,572
Utilities	22	83%	111,560	54%	65%	172,318
Information	51	71%	85,941	54%	76%	112,500
Arts, Entertainment, and Recreation	71	79%	72,380	56%	71%	102,661
Retail Trade (General and Non-Store)	45	79%	80,802	56%	71%	113,333
Finance and Insurance	52	77%	102,889	57%	73%	140,072
Transportation and Warehousing	48	84%	94,995	57%	68%	139,693
Construction	23	84%	91,227	58%	69%	131,779
Wholesale Trade	42	71%	106,920	58%	82%	130,717
Accommodation and Food Services	72	77%	75,539	58%	76%	99,796
Manufacturing (Metal & Other)	33	72%	113,730	59%	82%	138,842
Real Estate and Rental and Leasing	53	86%	91,645	63%	73%	125,439
Health Care and Social Assistance	62	80%	94,264	63%	78%	120,092
Professional, Scientific, and Technical Services	54	74%	109,986	65%	88%	124,916
Educational Services	61	86%	70,330	68%	79%	89,371
Public Administration	92	75%	105,338	73%	98%	107,106
Other Services (except Public Administration)	81	85%	81,019	77%	91%	89,476



### Conclusion and Discussion

While salary differentials between staff and chief executives dominates the popular press, many more people are impacted by the salary differentials that exist between the other levels within organizations, mainly, staff, manager and director. Notably, we found that the salary differences between levels is not evenly distributed between industries. Across the 20 industries analyzed, the average staff member compensation is 59% of the director level. However, in 14 of these industries, staff members are compensated at lower relative levels to directors and in only 6 industries are staff members compensated at higher relative levels to directors. It is useful to examine the characteristics of the industries at the ends of this spectrum.

The three industries with the lowest differential between staff and directors are Educational Services-NAICS 61, Public Administration-NAICS 92, and Other Services (except public administration)-NAICS 81. Conceptually, these represent two groups. The first group, Educational Services and Public Administration, is dominated by bureaucratic organizational forms, regulatory elements, and strong worker rights features. The second group, Other Services (Except Public Administration), is different. This NAICS category is dominated by less capital intensive small businesses, such as automotive, computer and appliance repair, beauty shops, dry cleaning, funeral homes and religious and civic organizations. In these types of organizations, senior levels are often more involved in the direct service or product level delivery.

The three industries with the highest differential between staff and directors are Manufacturing (Food & Textile)-NAICS 31, Manufacturing (Wood & Chemical)-NAICS 32, and Administrative, Support, Waste Management and remediation services-NAICS 56. These three industries also appear to break into two groups. The first group includes both the manufacturing NAICS codes. These are capital intensive industries, including paper manufacturing, chemical manufacturing, and petroleum manufacturing. These industries also include staff levels of work that are strongly manual labor intensive. The second group is represented by NAICS 56-Administrative, Support, Waste Management, and Remediation services. Firms within this NAICS code include, facilities support, call centers, pest control, janitorial services, and waste collection and disposal. These types of firms do not appear to have the capital intensity of the manufacturing firms, but they do possess strong manual labor aspects.

Given the manual labor element apparent in those industries with the highest discount between the staff and director level, this begs the question about the impact of education and technical skills on salary discount. We can examine NAICS 54 – Professional, Scientific, and Technical Services for this effect as it includes industries in which advanced education and technical skills are required. In this industry, staff are paid 65% of the director level. This is above the average of 59%, indicating that education and technical skills might moderate the effect. However, across all six industries where staff to director compression is above the average 59% level, the move from staff to manager level averages a positive 16% change in compression. For the Professional, Scientific, and Technical Services industry, the jump from staff to manager level averages a positive 23% change in compression. Therefore, while education and technical skills may indicate a higher initial compensation ratio vs. the director level, it is the softer skills involved in moving to the managerial level that provides the greatest increase in compensation.

### Limitations and Future Research

To an extent, the content of the provided data set limited the type and level of analysis that could be completed in this research project. Information about respondent gender, race, educational background, salary components (base and bonus compensation levels), detailed city and state locations, and specific jobs roles were not available in the Askamanager.org data set. Additionally, our focus was on the U.S. responses within the data. Further study into the data set to review salary and job position trends from a more regional or geographic perspective (e.g., major US regions: Southeast, Northeast, West, Central, etc.) is a logical next step in any extended research effort using the updated list of more than 24,000 responses. Research questions involving regional pay differentials among various occupational levels could also be analyzed for trends. We encourage researchers to utilize the descriptive information provided in this study to respond to calls for additional research into pay differentials, particularly when examining how pay differentials function across industries and occupational levels.

The future opportunity to collect more detailed information from those individuals who ascribe to the Askamanager.org site could greatly expand the type and conduct of salary and occupational research and analysis. In addition to the missing categories listed above, more information related to historical job career progression (salary changes, job function and level differences, movement in and out of various industries, etc.) could be invaluable to future research efforts. The Askamanager.org database is a wealth of information on salary and occupational data. With more supplied information and large numbers of responses, the data collection effort started in 2019 through this site could become a major source of occupational information.

### **Acknowledgment**

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