

# The Impact of Human Capital on Employee Compensation and Pay Performance Sensitivity

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## ABSTRACT

*More emphasis is put on human capital nowadays and firms are no longer defined only through their physical assets. As the human capital becomes more important, the employees require to be compensated more and the firms need to adopt their compensation contracts to this change in order to survive. In this paper, the findings suggest that compensation contracts in human capital intensive firms differ significantly from those in asset intensive firms. Executives and managers at every level receive higher levels of compensation and they get more of their pay in the form of incentive based compensation in human capital intensive firms. Such difference remains significant at all levels of management, including CEOs, other chiefs, divisional managers, and other managers. However, the largest change belongs to CEO compensation contracts. Further evaluation reveals that the pay performance sensitivity weakens in human capital intensive firms.*

**Keywords:** Executive Compensation; Human Capital; Firm Performance

**JEL classification:** J33; J24; L25

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## Introduction

The way a firm is defined had many arguments throughout the history. After recognizing that there are many different explanations for a traditional firm, Zingales (2000) argued that the definition of the traditional firm has to be reformed. He stated that in these days the nature of firm is changing. What the word “firm” should remind us is no more a combination on contracts, which have clear boundaries defined by its physical assets. In the old days, firms were very asset sensitive and highly vertically integrated. They used to have a tight control over their employees, and this control was concentrated at the top levels of the management (Zingales (2000)). However, as the large conglomerates broke up and started to form new stand alone firms, and vertically integrated firms gave up the direct control of their suppliers, the power of these firms on their employees decreased. This situation has to have consequences in the employee compensation contracts. As the management’s power over the employees changes, the way to first attract these employees to hire, and then to motivate them to work harder for the firm has to be changed as well. After recognizing such transformation in the markets, it could be argued that

more research is needed on the connection between this new world and the compensation contracts in the firms competing in this new world.

Literature offers various perspectives for employee compensation. However, most of them only aimed to make a connection with the firm performance. The authors believed that the compensation plan they apply for their mostly top level employees have to be effective on the performance of their firms. And actually, they had satisfactory results to make us believe that the compensation of the top-level management is associated with firm performance. They pointed out the factors effective in this relationship and attempted to give optimal compensation contract advises to the market. Jensen and Murphy (1990) argued that the optimal compensation contracts must reflect the trade-off between the goals of providing efficient risk sharing and providing the CEO with the incentives to take appropriate actions. They also showed that the total compensation contract can be analyzed item by item, and the marginal impacts of these items on the performance of the firm can be examined. For instance, one of their findings was the largest CEO incentives come from ownership of their firms' stock. Gibbons and Murphy (1992) also studied these optimal incentive contracts. By putting the idea of the career concerns of the employees, they figured the way to form the optimal contract is to make a balance between explicit contractual incentives and career concern incentives. Another idea that can be connected to the compensation contracts was the investment opportunities, which was put forward by Baber, Janakiraman, Kang (1996). They argued that the interaction between compensation and the firm performance will be stronger with the greater investment opportunities the firm has. Another aspect of their work was to go deep in the determinants of the executive compensation. The statement at the beginning of the paper was that the calculation of the executive compensation should include the stock option values, restricted stock, and long-term incentive payments (Baber, Janakiraman, Kang (1996)). In addition, Rose and Shepard (1997) showed us that diversified firms have more cash compensations for their CEOs than that undiversified firms have.

As a continuation of this literature strand, Aggarwal and Samwick (2003) takes to idea of the relationship between firm performance and the compensation contracts into the deeper levels of the firm. They argued that the focus on CEOs ignores the other important issues in the internal organization of the firm. They categorized managers of the firm into 4 different groups, and discussed the strength of the linkage of performance and compensation for each level of managers. This approach offers additional perspectives to the pay-performance sensitivity issues.

It is very appealing to explore the notion that employee compensation has an impact on the firm performance and that each level of managers have different impacts on this performance in the changing world that Zingales (2000) mentions. As the definition of the firm evolves, the impact of each different level of managers on the firm performance has to be renewed. Although these differences can be analyzed just by comparing the levels of compensation at each level of the management, the impact on the performance is also important.

In this paper, I examine the association between compensation contracts and firm type, meaning either asset-intensive firms or human capital-intensive firms. This evaluation is not limited to the CEOs of such firms. I examine the lower levels of management, including other chiefs,

divisional managers, and other managers. The compensation contracts are evaluated at two categories, cash based compensation and incentive based compensation. Moreover, I explore the pay-performance sensitivities of different firm types.

The remainder of the paper is organized as follows. Section 2 explains the changing world and its impact on employee compensation in detail. Section 3 describes the executive compensation dataset, the company classification based on the human capital intensity, also the employee classification based on their ranking in the firm. The initial results gathered from the descriptive statistics are presented in Section 4, and the multivariate results are given in Section 5. Finally, Section 6 concludes the paper.

## **The Changing World and Employee Compensation**

There are three main features of the traditional firms that are relevant to the scope of this paper. First of all, those firms were highly assets sensitive. As a result of the industrial revolution, firms were aware of the opportunities of economies of scale and scope, by which they were far ahead in the competition with the new entering firms to the market. And the way to benefit from these ideas was to acquire the necessary assets, make their business depend on those assets, and start using them heavily. In other words, those firms were highly asset. Those were the times we were able to observe a firm with their clear boundaries defined by their physical assets. Employees were only the ones responsible from these precious assets. Human capital was not something so important, since the businesses were depending on physical assets. In today's organizations, labor started to become more specialized and more talented. As we have more graduates from the universities, more educated labor enters the market, and the human capital starts to have the importance it deserves. Actually, the only way for firms to stay alive in their competitive environment is to obtain innovations, new ideas which they can use to sustain their market shares. And it is not possible to do so with physical assets only. Firms need human brain, human ideas and talent, which they can only find in human capital. That is the reason why human capital is emerging as the most crucial asset for a firm. In such a world, employees are not the ones in charge of operating the valuable physical assets, but the valuable assets themselves (Zingales (2000)). Physical assets started to be less unique, and the key employees are the main assets for firms. As firms start to see their employees more and more important, they have to do something to keep them. Then, a firm should understand how valuable their employees are, and should somehow reflect this understanding to their employees. The only way to do so is to use compensation contracts. The more important the employee is for the firm, the higher he/she needs to be compensated. So, in a world human capital becomes increasingly important, firms have to adjust their compensation contracts accordingly.

The second characteristic of a traditional firm was the high degree of vertical integration they had. Actually this vertical integration was a part of their understanding of doing business. They were trying to have the control of their suppliers and distributors in order to have a competitive advantage over other firms. And as a result of this integration, the market size was diminished and number of competitors decreased. All of these also caused labor market to shrink. So, traditional firms, as the third characteristic, also controlled the main source of employment of its specialized employees, since they had not that much alternatives to consider. This used to give the firms a tight control over their employees. However, as large conglomerates started to break

up, and vertically integrated firms had to give up the influence on their suppliers, the power they had over their employees reduced. And also, this made the world market more competitive, more innovation required, and more quality improvement necessary, all of which can only be possible by human capital. Alternative employment opportunities created for the employees and the talent, specialization and knowledge they have, made human more important for the firms. So, it not as easy as it was for the firms to keep their employees. Firms need to offer something additional to convince their employees to stay. This is nothing but adjusted compensation contracts. So, the more human capital intensive the market is, the more emphasis firms should put on the compensation of their employees. Knowing that human capital is less dependent to their current employers, this is the only way for firms to keep their employees.

Summarizing, not all of the firms we see nowadays are the type of the traditional firm explained above. There are new industries, new organizations, new firms which tend to be less physical asset-sensitive and non-vertically integrated. They operate in a highly competitive environment, and have to be more human capital intensive. In addition, the control of the firms over its employees is limited by the ability of employees to quit and take with them their human capital, which is actually a part of the firm (Zingales, (2000)). In order to survive in this changing environment, firms cannot leave their existence to chance. They do have to keep their employees, and that is the reason why the importance of the compensation contracts became apparent. Firms have to adjust these contacts in a way that convinces their employees not to quit, and stay with the firm.

## **Data**

### **Data Collection**

The source of my data is ExecuComp data set, a supplement of the Compustat data set. The sample covers the years from 1992 and 2004, compares the executive compensation data between asset intensive and human capital intensive firms. Also, the data set combines the executive compensation data with corresponding firm performances for further analysis. However, since Executive Compensation data is collected from each company's annual proxy, there appears to be some missing data from the initial years in my set. Therefore some data omission was required. ExecuComp collects up to 9 different executives for a given year, but most of the companies report only 5. I reached sufficient information for the lower level executives, although they were quantitatively less than that of the top level executives. So, my data contains 31,628 executive-year observations after all missing and unavailable data was disposed of.

### **Company Classification**

The purpose of this paper is to show how important the human capital is for the companies in this new emerging world. So, we have to see separately the firms which are human capital intensive and which are not. To do so, Standard Industrial Classification (SIC) System has been utilized. The SIC codes divides the industries according to their characteristics, which gives

sufficient information about the firms being human capital intensive or not. I used two-digit SIC codes, and the cut point was 60. I classified the industries using two-digit SIC codes less than 60 as non human capital intensive, and those with two-digit SIC codes more than 60 as human capital intensive. For the rest of the paper, I called these firms as ‘asset firms’ and ‘human firms’, respectively.

Actually it was a clear-cut classification. The Asset Firms are Agriculture, Mining, Construction, Manufacturing, Transportation and Communication, Wholesale Trade and Retail Trade firms. These are really physical asset driven industries, which require firms to depend their businesses on their assets. It is for sure that their human capital plays a role on their business, but the degree of this role even cannot be compared to that in the Human Firms. The Human Firms consist industries that are Finance, Insurance and Real Estate, Services and Public Administration. The firms competing in these industries are clearly more human capital intensive. Their businesses rely on the talents, abilities and successes of their employees. They do not have physical assets as much as the Asset Firms have, at least their way of doing their business does not pass through their assets that much heavily.

### **Employee Classification**

The focus of this paper is not only on CEOs, but also on lower levels of management. The data belongs to ExecuComp, so I had to face the limitations of the database. Since the data was collected through the proxy statements, they were able to have only the compensation data belonging to the top 9 executives. I decided to rank these executives, so that I will be able to categorize them. Aggarwall and Samwick (2003) used the job title reported in the database to classify these executives. However, the database provides the ranking of the executives, according to their salary and bonus. Actually this ranking gives us almost the same ranking that we have with the job title. This is predictable since higher level titled executives have higher levels of salaries.

After having the employees ranked, I classified them into four different groups. First group, named as ‘CEOs’ consists only the executives ranked 1<sup>st</sup>. They are all the CEOs of the firms, since CEOs are the ones with the highest salary. Second group, named as ‘Other Chiefs’, has the executives ranked at the 2<sup>nd</sup> and the 3<sup>rd</sup> place. They are all the chief officers other than the CEO, and the vice presidents in the firm. They are the ones that we can categorize below the CEOs, in terms of salary, power, and impact on the firm’s decisions. The third group, named as ‘Divisional Managers’, covers the executives with the salary ranking of 4<sup>th</sup> and 5<sup>th</sup>. They are the divisional managers, like marketing, sales, special projects, and the international divisions. The last group, called ‘Other Managers’, has the executives with rankings less than 5. Generally, they are the managers responsible from production, like engineering and exploration, and all the other lower level managers.

The idea of having these executives classified and grouped is that, I wanted to see the differences of the compensation levels of these different levels of executives. This classification, together with the grouping of the firms, is given in Table 1. Usually what we see is the decreasing levels of compensations as we go down the levels of the executives, i.e. lower the power level, lower

the compensation level. This was the case for traditional firms. The decision making power was concentrated at the top levels of the firm, and it was diminishing as you look at the lower levels. However, as the human capital started to be more and more important for the firms, the decision making power is no more concentrated at the top. As this power flows to the lower levels, there should be a change in their compensation levels, because they are more important for their firms than they were now, and they want to be compensated more. This classification of the employees provides to visualize this change in the different levels of the executives.

**Table 1**  
**Sample Information**

The classification of the firms, all levels of managers, and their observation counts are given.

<b>Manager Category</b>	<b>Asset Firms</b>		<b>Human Firms</b>		<b>Total</b>	
	<b>No. of obs</b>	<b>Frequency</b>	<b>No. of obs</b>	<b>Frequency</b>	<b>No. of obs</b>	<b>Frequency</b>
CEOs	6,282	19.86%	1,595	5.04%	7,877	24.91%
Other Chiefs	9,857	31.16%	2,675	8.46%	12,532	39.62%
Divisional Managers	7,823	24.73%	2,032	6.43%	9,855	31.16%
Other Managers	1,013	3.21%	351	1.11%	1,364	4.32%
Total	24,975	78.96%	6,653	21.04%	31,628	100%

### Compensation Calculation

While evaluating employee compensation, an item-by-item classification makes it possible to comprehend the changes in the contract due to the new emerging human capital intensifying world. In this paper, I constructed and analyzed the compensation contract as follows: The first classification is saying that Total Compensation equals to the Cash Compensation and Incentive Compensation.

$$\text{Total Compensation} = \text{Cash Compensation} + \text{Incentive Compensation}$$

Cash Compensation consists of salary, bonus and other annual. And, Incentive Compensation covers restricted stock grants, restricted stock holdings, options granted, option holdings, long term incentive payouts and all other compensation. All the explanations are given in the Table 2.

**Table 2**  
**Total Compensation Items and Their Explanations**

The format of the compensation contracts analyzed in the paper is as follows. The items classified under the two main titles used in the paper are explained in the table.

<b>TOTAL COMPENSATION</b>	<b>Explanation</b>
<b>CASH COMPENSATION</b>	

Salary	Base salary earned by the executive this year
Bonus	Cash and non-cash bonuses earned by the executive
Other Annual	Perquisites and other personal benefits
<b>INCENTIVE COMPENSATION</b>	
Restricted Stock Grants	Value of stocks granted to the executive this year
Restricted Stock Holdings	Value of stocks granted to the executive previous years
Options Granted	Value of options granted to the executive this year
Option Holdings	
Options Exercised	Value realized from options exercised this year
Unexercised Exercisable Options	Value of options not exercised, but exercisable
Unexercised Unexercisable Options	Value of options not exercised, and not exercisable
Long Term Incentive Payouts	Amount paid out to the executive under the company's LTIP
All Other Compensation	Tax reimbursements, life insurance premiums, etc.

## Descriptive Results

### Initial Results

After having the companies, employees and compensation contract items classified, the sample is ready for initial analysis. In addition, I have constructed two additional compensation items to analyze the structure of the compensation contracts. Percentage Cash Compensation and Percentage Incentive Compensation simply measure the form of compensation that each employee receives. The calculations are presented below.

$$\% \text{ Cash Compensation} = \frac{\text{Cash Compensation}}{\text{Total Compensation}}$$

$$\% \text{ Incentive Compensation} = \frac{\text{Incentive Compensation}}{\text{Total Compensation}}$$

Since I have different categories of employees (CEOs, Other Chiefs, Divisional Managers, Other Managers) for each different types of firms (Asset Firms, Human Firms), and compensation items for level and structure for each of those, I have all the necessary connections among the dataset. The descriptive statistics of all the variables are presented in Table 3. Panel A in Table 3 evaluates all managers at once, and presents the descriptive statistics. Panel B classifies the managers into four categories as explained in previous sections, and for each category, the descriptive statistics are displayed.

**Table 3**  
**Descriptive Statistics**

Descriptive statistics of the sample is displayed in this table. Figures are expressed in thousands.

***Panel A: All Executives/Managers***

Variables	Mean	Median	Std. Dev.	10 <sup>th</sup> Percentile	90 <sup>th</sup> Percentile
Cash Compensation	798.7	501.0	1,281.2	198.6	1,581.5
Incentive Compensation	6,025.9	1,044.9	21,634.2	11.5	12,989.9
Total Compensation	6,824.6	1,629.4	22,172.5	280.1	14,563.6
% Cash Compensation	0.42	0.33	0.32	0.07	0.96
% Incentive Compensation	0.58	0.67	0.32	0.03	0.92

***Panel B: Each Executive/Manager Level Separately***

Variables		Mean	Median	Std. Dev.	10 <sup>th</sup> Percentile	90 <sup>th</sup> Percentile
CEOs	Cash Compensation	1,305.0	844.8	2,023.02	316.5	2,677.3
	Incentive Compensation	12,507.5	3,005.6	35,569.5	65.4	29,947.8
	Total Compensation	13,812.5	3,975.2	36,291.5	560.8	32,525.8
	% Cash Compensation	0.33	0.23	0.29	0.05	0.85
	% Incentive Compensation	0.66	0.77	0.29	0.14	0.94
Other Chiefs	Cash Compensation	717.4	483.4	931.9	201.7	1,374.8
	Incentive Compensation	4,793.3	1,029.9	15,582.5	13.8	11,085.5
	Total Compensation	5,510.8	1,594.0	16,066.6	290.5	12,445.3
	% Cash Compensation	0.42	0.32	0.31	0.07	0.95
	% Incentive Compensation	0.58	0.67	0.31	0.04	0.92
Divisional Managers	Cash Compensation	529.35	373.1	724.9	172.1	1,003.1
	Incentive Compensation	2,675.2	507.0	10,243.7	6.6	6,046.1
	Total Compensation	3,204.5	935.45	10,510.1	229.1	6,948.1
	% Cash Compensation	0.49	0.42	0.32	0.10	0.98
	% Incentive Compensation	0.51	0.58	0.32	0.02	0.90
Union Managers	Cash Compensation	567.2	395.4	733.9	144.2	1,083.2
	Incentive Compensation	4,129.7	491.3	14,731.4	3.9	8,171.4

Total Compensation	4,696.9	924.5	15,090.4	205.9	9,239.0
% Cash Compensation	0.50	0.44	0.34	0.07	0.98
% Incentive Compensation	0.50	0.56	0.34	0.01	0.92

Panel A for Table 3 displays the descriptive statistics for the full sample. The average Cash Compensation for all levels of managers is around \$800,000, while the average Incentive Compensation is around \$6 million. The managers in the sample are receiving Total Compensation of \$6.8 million. They receive about 42% of this compensation in the form of Cash Compensation, and 58% of that in the form of Incentive Compensation. Panel B for Table 3 presents the descriptive results for each management category separately. Based on the results, CEOs are receiving the highest Total Compensation figures. Consistently, they are the ones who receive the highest levels of Cash Compensation and Incentive Compensation. In terms of the differences in compensation structure, they are the ones with the lowest percentage of Cash Compensation, along with the highest percentage of Incentive Compensation.

As we move down on the management categories, we will recognize that the average figures for compensation levels go down. Also, the lower level managers receive more of their compensation in the form of Cash Compensation, and less in the form of Incentive Compensation. However, further evaluation is needed to see if such differences are statistically meaningful. The statistical analysis of these differences is presented in the next section

### Mean Difference Tests

Descriptive statistics explained above provides essential insight about the sample. However, the point of interest for this paper is the effect of human capital intensity on the compensation contracts. Therefore, comparison of the key compensation items among different firm types is necessary. In Table 4, I present the results of the mean difference tests for Asset Firms and Human Firms, for compensation level and structure.

**Table 4**  
**Descriptive Results – Effect of Firm Type on Executive Compensation Contracts**

The table reports the mean differences of key variables of compensation contracts between executives and managers in asset-intensive firms and human capital-intensive firms. Figures are expressed in thousands. \*, \*\*, \*\*\* denotes significance at a 10% level, 5% level and 1% level, respectively.

***Panel A: All Executives/Managers***

Variables	Mean Values			t value
	Asset Firms	Human Firms	Asset vs. Human firms	
Cash Compensation	716	1,107	-390	-22.26 ***
Incentive Compensation	5,130	9,388	-4,258	-14.31 ***
Total Compensation	5,846	10,495	-4,648	-15.25 ***
% Cash Compensation	0.44	0.37	0.07	14.11 ***
% Incentive Compensation	0.56	0.63	-0.07	-14.11 ***

**Panel B: Each Executive/Manager Level Separately**

Variables		Mean Values			t value
		Asset Firms	Human Firms	Asset vs. Human firms	
CEOs	Cash Compensation	1,166	1,849	-683	-12.15 ***
	Incentive Compensation	10,957	18,614	7,657	-7.71 ***
	Total Compensation	12,124	20,464	-8,340	-8.23 ***
	% Cash Compensation	0.34	0.30	0.04	5.67 ***
	% Incentive Compensation	0.66	0.70	-0.04	-5.67 ***
Other Chiefs	Cash Compensation	643	991	-348	-17.35 ***
	Incentive Compensation	3,835	8,323	-4,488	-13.30 ***
	Total Compensation	4,478	9,315	-4,837	-13.91 ***
	% Cash Compensation	0.43	0.36	0.07	10.64 ***
	% Incentive Compensation	0.57	0.64	-0.07	-10.64 ***
Divisional Managers	Cash Compensation	478	726	-248	-13.93 ***
	Incentive Compensation	2,451	3,537	-1,086	-4.26 ***
	Total Compensation	2,929	4,264	-1,335	-5.11 ***
	% Cash Compensation	0.50	0.44	0.06	8.14 ***
	% Incentive Compensation	0.50	0.56	-0.06	-8.14 ***
Other Managers	Cash Compensation	482	813	-331	-7.43 ***
	Incentive Compensation	2,288	9,443	-7,155	-8.02 ***
	Total Compensation	2,770	10,257	-7,486	-8.20 ***
	% Cash Compensation	0.51	0.45	0.06	2.85 ***
	% Incentive Compensation	0.49	0.55	-0.06	-2.85 ***

Panel A in Table 4 displays the results of the mean difference tests for all management levels. The results suggest that compensation level and structure differ significantly in Asset Firms and Human Firms. The managers in Human Firms have higher levels of Cash Compensation and Incentive Compensation, and therefore Total Compensation. The managers in Human Firms get \$10.5 million on average, while those in Asset firms get \$5.8 million. Moreover, they receive more of their compensation in the form of Incentive Compensation. The managers in Human Firms receive about 63% of their compensation in the form of Incentive Compensation, whereas that percentage is only 56% for the managers in Asset Firms.

The findings support the notion that human capital intensity has a significant effect on the compensation contracts. Since the Human Firms are more dependent on their employees, they have to show how much they care for them. This explains the rise in the level of compensation. This also reflects the improved power of employee in human capital intensive firms.

Moreover, the significant increase in the level of incentive compensation and the Percentage of Incentive Compensation for Human Firms might be explained by saying that human capital intensive firms want to reward their employees more as they perform more. And by offering compensation more in the form of incentive based compensation, and less in the form of cash compensation, they motivate their employees to work harder for the firm. That is how Human Firms try to get the power they used to have on their employees back. Since human capital gained more power, firms need to find a better way to make them still perform well, and increasing the percentage of the stocks and options in their compensation contracts is the way of doing so.

Panel B in Table 4 repeats the mean difference tests for every management category. The results support the previous findings. At each management level, managers in Human Firms receive higher levels of Cash and Incentive Compensation, and also Total Compensation. In addition, at each management category, managers in Human Firms get more of their compensation in the form of Incentive Compensation, compared to those in Asset Firms. These results support the notion that the power is no longer concentrated on the top levels in human capital intensive firms. The relatively lower level executives also have the power to force their firm to increase their compensation levels and adjust their compensation contract structures. These findings introduce the need to analyze which difference is greater. It could lead to better understanding of the impact of human capital intensity on compensation contract. The following sections attempt to do so.

All of the descriptive statistics results lead to similar findings. As the firms become more and more human capital intensive; the power which used to be concentrated at the top, goes down to the lower levels of employees because they became more crucial for their firm. As a result, the firms need to compensate all their employees more and also alter their compensation contract structures in a way to motivate their employees more as well. Moreover, this increase in the compensation level and the change in compensation structure would exist for the lower level of management, since they have more power now than what they had in an asset sensitive firm.

In the next section, I present the multivariate test results for the effect of human capital intensity on compensation level and structure, and also I examine how these changes in compensation level and structure are attributable to the pay-performance sensitivities.

## **Multivariate Results**

### **Effect of Firm Type on Executive Compensation**

In this section, I examine the question of interest in a multivariate setting. I evaluate the effect of human capital intensity on compensation level and structure, after controlling for firm size and year effects. The results are presented in Table 5. Panel A in Table 5 displays the results from the regression using all the managers without their categories. The purpose is to see the impact of firm type on compensation contracts in general. To serve this purpose, the regression model

includes a dummy variable for human capital intensive firms. The regression model is presented below:

$$\text{Compensation} = \alpha_0 + \alpha_1(\text{Human Firm}) + \alpha_2(\text{Asset Size}) + \sum \alpha_i(\text{Industry Dummy}) + \sum \alpha_j(\text{Year Dummy}) + \varepsilon$$

The multivariate results support previous findings and suggest that managers, regardless of their ranking, receive significantly higher levels of compensation in human capital intensive firms. Moreover, managers in such firms also get more of their compensation in the form of incentive based compensation.

**Table 5**  
**Multivariate Results – Effect of Firm Type on Executive Compensation Contracts**

The table reports the regression analysis results to evaluate the impact of human capital intensity on compensation contracts, in terms of level and structure. “Human Firm” variable is a dummy variable which is equal to 1 when the firm is human capital intensive, and equal to zero otherwise. The regression models are included under each panel. \*, \*\*, \*\*\* denote significance at a 10% level, 5% level and 1% level, respectively. The t-statistics are given in parenthesis below each estimate.

**Panel A: All Executives/Managers**

$$\text{Compensation} = \alpha_0 + \alpha_1(\text{Human Firm}) + \alpha_2(\text{Asset Size}) + \sum \alpha_i(\text{Industry Dummy}) + \sum \alpha_j(\text{Year Dummy}) + \varepsilon$$

Variables	Dependent Variable = Compensation							
	Level				Structure			
	Cash	Incentive	Total		% Incentive			
	Compensatio n (1)	Compensatio n (2)	Compensatio n (3)		Compensatio n (4)			
Intercept	1,094.3 *** (39.35)	8,750.5 *** (17.87)	9,844.8 ** (19.68)		0.7438 *** (104.4)			
Human Firm	176.2 *** (10.29)	2,370.3 *** (7.86)	2,546.6 ** (8.27)		0.0561 *** (12.78)			
Asset Size	0.006 *** (54.60)	0.055 *** (28.84)	0.062 ** (31.28)		0.0003 *** (11.94)			
Dummies for years	yes	yes	yes		yes			

Adj. R <sup>2</sup>	0.1226	0.0466	0.0529	0.0627
Sample Size	31,564	31,564	31,564	31,564

**Table 5 (continued)**

**Multivariate Results – Effect of Firm Type on Executive Compensation Contracts**

**Panel B: Each Executive/Manager Level Separately**

$$\text{Compensation} = \alpha_0 + \sum \alpha_l(\text{Executive Type}) + \sum \alpha_k(\text{Executive Type})(\text{Human Firm}) \\ + \alpha_1(\text{Asset Size}) + \sum \alpha_i(\text{Industry Dummy}) + \sum \alpha_j(\text{Year Dummy}) + \varepsilon$$

Variables	Dependent Variable = Compensation							
	Level				Structure			
	Cash	Incentive	Total		% Incentive			
	Compensatio	Compensatio	Compensatio		Compensatio			
	<i>n</i>	<i>n</i>	<i>n</i>		<i>n</i>			
	(1)	(2)	(3)		(4)			
Intercept	879.1 *** (19.86)	6,328.2 *** (7.96)	7,207.3 *** (8.90)		0.6694 *** (58.12)			
CEO Dummy	749.7 *** (19.16)	9,258.2 *** (13.17)	10,008.0 *** (13.98)		0.1928 *** (18.93)			
(CEO Dummy) (Human Firm)	478.4 *** (14.70)	5,858.7 *** (10.02)	6,337.1 *** (10.64)		0.0388 *** (4.60)			
Other Chiefs	195.4 *** (5.13)	1,741.2 *** (2.55)	1,936.6 *** (2.78)		0.0889 *** (8.97)			
(Other Chiefs) (Human Firm)	145.2 *** (5.70)	2,742.7 *** (5.99)	2,887.8 *** (6.19)		0.0695 *** (10.50)			
Divisional Managers	1.65 (0.04)	72.53 (0.10)	74.19 (0.11)		0.0085 (0.85)			
(Divisional Managers) (Human Firm)	46.1 * (1.59)	- (-1.27)	-614.2 (-1.16)		0.0632 *** (8.39)			
(Other Managers) (Human Firm)	38.3 (0.54)	4,472.5 *** (3.48)	4,510.8 *** (3.44)		0.0457 ** (2.45)			
Asset Size	0.0059 *** (56.51)	0.0553 *** (29.15)	0.0613 *** (31.69)		0.0003 *** (11.97)			
Dummies for years	yes	yes	yes		yes			

Adj. R2	0.1897	0.0841	0.0944	0.1098
Sample Size	31,564	31,564	31,564	31,564

Panel B in Table 5 shows the multivariate results at every management category separately. The impact of human capital intensity is split into four groups for CEOs, Other Chiefs, Divisional Managers, and Other Managers, by using dummy variables representing each category. In addition, the interaction variables of such dummy variables with the firm type dummy variable reveal additional information about the impact of human capital intensity at every management level. The model is presented below:

$$\begin{aligned} \text{Compensation} = & \alpha_0 + \sum \alpha_l(\text{Executive Type}) + \sum \alpha_k(\text{Executive Type})(\text{Human Firm}) \\ & + \alpha_1(\text{Asset Size}) + \sum \alpha_i(\text{Industry Dummy}) + \sum \alpha_j(\text{Year Dummy}) + \varepsilon \end{aligned}$$

The results support the previous findings in the way that managers, at every level, receive significantly more compensation, and more in the form of incentive based compensation. This finding is gathered from the significance of the interaction variables.

As an additional step, I evaluate each individual management level and compare them among each other. The biggest impact of human capital intensity is on CEOs, and also the impact remains significant at the lower levels of management. The largest increase in compensation levels occurs for CEOs, and then for Other Chiefs and Other Managers. Divisional Managers seem to have no significant increase in their total compensation level, however they receive significantly higher cash compensation. Interestingly, the increase in the total compensation level for Other Managers is greater than that of Other Chiefs, mainly due to the significant increase in their incentive compensation. Moreover, I evaluate the effect of human capital intensity on compensation structure at every management level. Similar to the previous results, managers receive more of their compensation in the form of incentive compensation, regardless of their management level.

These results support the notion that the new changing world has significant effects on the compensation contracts, due to increased need for human capital. The human capital intensive firms have decentralized power in the companies and managers at very level have sufficient power to matter for their firms. Therefore, firms need to adjust their compensation contracts, in terms of level and structure, to attract and retain necessary managers, not only at the CEO level, but also at every other lower level management category.

### **Pay-Performance Sensitivities**

The previous sections of the paper cover the discussion about the effects of human capital intensity on the compensation level and structure of different levels of managers. And there was a significant change in the compensation contracts, which can be explained by the emerging features of the human capital intensive firms and the employees in those firms. However, this finding only points out the need to explore this issue even more. These changes might have some impacts on the pay performance sensitivities, since the power balances in the firm has been

modified. Each level of executives started to receive increased amount of compensation, and each item of the compensation contract was affected differently from this transition. All of these changes might influence the firm performance in a different way and also there should be different impacts on human capital intensive and asset intensive firms.

In order to explore the impact of human capital intensity on pay performance sensitivities, I run a regression of firm performance on human capital intensity, compensation level and structure variables, after controlling for the firm size, year effects and industry effects. The regression model utilized in this section is presented below.

$$Performance = \alpha_0 + \sum \alpha_l(Compensation\ Type) + \sum \alpha_k(Compensation\ Type)(Human\ Firm) \\ + \alpha_1(Asset\ Size) + \sum \alpha_i(Industry\ Dummy) + \sum \alpha_j(Year\ Dummy) + \varepsilon$$

While working with the firm performance, I needed to use some proxies which reflect the behavior of firm performance the best. As done many times in the literature, I have used Return on Asset (ROA) and Tobin's Q. Using two different types of proxies gives me the chance to capture the effects of firm performance better. While monitoring the firm's performance by ROA, we can analyze the performance just in those years. However, since market value is used in Tobin's Q calculation, it gives us an improved understanding about future performance. So, using both of them helps us to capture the firm performance better.

**Table 6**

**Multivariate Results – Effect on Firm Type on Pay Performance Sensitivity**

The table reports the regression analysis results to evaluate the impact of human capital intensity on pay performance sensitivities. “Human Firm” variable is a dummy variable which is equal to 1 when the firm is human capital intensive, and equal to zero otherwise. The regression model utilized is also included below. \*, \*\*, \*\*\* denote significance at a 10% level, 5% level and 1% level, respectively. The t-statistics are given in parenthesis below each estimate.

$$Performance = \alpha_0 + \sum \alpha_l(Compensation\ Type) + \sum \alpha_k(Compensation\ Type)(Human\ Firm) \\ + \alpha_1(Asset\ Size) + \sum \alpha_i(Industry\ Dummy) + \sum \alpha_j(Year\ Dummy) + \varepsilon$$

Variables	<i>Dependent Variable = Firm Performance</i>			
	<i>Tobin's Q</i>		<i>ROA</i>	
	(1)	(2)	(3)	(4)
Intercept	1,008.7 *** (9.13)	0.7227 *** (6.36)	5,835.3 *** (6.06)	4.7560 *** (4.86)
Cash Comp	-0.6744 *** (-7.65)		0.6861 *** (8.93)	

(Cash Comp) (Human Firm)	0.5157 *** (4.58)		-0.6281 *** (-6.40)	
Incentive Comp	0.1577 *** (36.58)		0.0286 *** (7.62)	
(Incentive Comp) (Human Firm)	-0.1085 *** (-16.83)		-0.0202 *** (-3.60)	
% Incentive Comp		0.8020 *** (34.65)		4.3945 *** (22.03)
(% Incentive Comp) (Human Firm)		- *** 0.4058 (-8.26)		- *** 2.9265 (-6.91)
Asset Size	-0.0117 *** (-10.39)	- *** 0.0001 (-10.13)	*** -0.0033 (-3.14)	*** 0.0002 (-2.85)
Dummies for industries and years	yes	yes	yes	yes
Adj. R2	0.1598	0.1536	0.0327	0.0401
Sample Size	31,564	31,564	31,564	31,564

The results of the regression analysis are displayed in Table 6. In columns 1 and 2, the dependent variable is Tobin's Q, whereas it is ROA in columns 3 and 4. For each dependent variable, the regression model uses compensation level and then structure variables. Interestingly, higher pay does not lead to higher performance sensitivity in Human Firms. For cash compensation, higher levels of payment create stronger pay performance sensitivities in Human Firms, only when performance is measured by Tobin's Q. However, higher incentive compensation levels and more payment in the form of incentive compensation create significantly lower increases in firm performance. These results are consistent when performance is measured by either Tobin's Q or ROA.

These findings can be explained in many different ways. This might be simply due to the changing world. There could be more competition nowadays in the markets, especially among human capital intensive firms. It may not be as easy as it was in the old times to improve pay performance sensitivities. Also, the reason might well be the entrenchment issue. Now that all levels of managers have more power within their firms, they may not be working as hard as they should. In general, these findings suggest that there is need for further research on this topic. There could be some other reasons behind the results. For instance, there could actually be an improvement over the years and it might be going to be better in future. Therefore, a year-by-year evaluation may reveal more information about pay-performance sensitivities. Also, it might be an indication that more change is required in the compensation contracts due to human capital intensity. All these topics are reserved for future studies.

## Conclusion

In the changing environment and market conditions, firms have to adopt their structures to the changes in order to survive. The emphasis put on human capital is the feature of these new firms that is examined in this paper. As big conglomerates break up, become non-vertically integrated, and relinquish their control power over their suppliers and distributors, their employees found themselves in a world full of other employment opportunities. And also, the new emerging way of competition required for firms to be innovative, bring out new ideas and serve their customers better. So human capital became increasingly important for the firms, and the employees gained more power. From now on, firms are no more defined through their physical assets, and these assets are not the center of their business. We start to see these firms as a unique combination of their physical and human capital.

Understanding how human capital changes the structures of these firms, another idea appears in our minds. As human capital becomes more important for the firms, it shifts the power from top levels to the lower levels, and there should be some other impacts on employee compensation contracts. Lower level employees are no more ineffective for the firm, and that is why they also need to be compensated. The findings in this paper suggest that the level and the structure of executive compensation in human capital intensive firms are significantly different than that in asset sensitive firms. All levels of managers in human capital intensive firms receive higher levels of cash and incentive compensation and they receive more of their payment in the form of incentive based compensation.

When we look inside the firms, we realize that the increase in the compensation levels and the increase in incentive compensation percentage remain as we go below at the management levels. This is clear enough to understand that employees' are now more important for the firms, and even the lower level employees become effective for the firm's business.

The other important impact of emerging human capital intensity is on the relationship between compensation contracts and firm performance. The results suggest that higher levels of compensation do not lead to higher pay performance sensitivity in Human Firms. In addition, more payment in the form of incentive compensation creates significantly lower increases in firm performance. These findings might be explained in various aspects, such as increased competition, or even entrenchment. However, in order to have a better understanding of the concept, more research is required.

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