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INVESTIGATION OF EXISTENCE OF POSITIVE CORRELATION BETWEEN EMPLOYERS HAVING CFA CERTIFICATE AND THOSE WHO DIDN'T HAVE CFA CERTIFICATE

Abstract: This article provides a comprehensive analysis of the problem connected with the widespread notion that the participation the CFA examination is something like wasting time in idleness. The primary goal of this research work is to identify if there is a positive correlation between the participation in the exam and job prospects. Keeping this ambitious goal in mind, representative data is gathered and studied for the existence of a positive correlation between people, who pass the CFA examination and job prospects or so called "job satisfaction".

Regression equations offer analyses that are constructed to help to calculate the regression coefficients. The regression coefficient was compared to the regression equation, which is based on the income level and satisfaction level of people who pass the exam and the alternative regression coefficient of the regression equation of those who have MBA degree. Analysis is done by conducting different hypothesis tests, regression analysis and other statistical procedures.

Key words: CFA, regression, examination, job prospects, job opportunity, income, MBA, statistics.

It is generally believed in Kazakhstan that MBA level is enough for a good career path in a sphere of banking, investments and finance. However, the world is changing and criteria of a good worker are changing as well. CFA examination consists of 3 level and it is extremely useful to prepare research analysts, private bankers, financial consultants and investment bankers and enhance their career path.

The material of CFA is very thorough and very extensive. But it also means that if you succeed in obtaining the charter, you can be assured of a great, solid grounding in financial knowledge and expertise[1].

CFA examination has already been existing in Kazakhstan, so that there is sufficient data which will be given below. In fact, there has never been conducted the research about in Kazakhstan and its influence on the future life prospects. But, in a world where the graduate faces of such examination in labor market, it is important to know whether such examinations are helpful to enforce the progress of individual`s

future career. So, in this article at the first it is investigated for the existence of the positive correlation between the participation in the CFA and job prospects, and consequently job satisfaction. Overall, there are 57 people, which have passed CFA. Every year on average more than 100000 people participate in the examination, so that the 43%, 46% and 54% pass the first, second and third level respectively. That`s why the target population is big enough to conduct the research and make conclusion.

Purpose: The primary goal of this research work is to identify if there is a positive correlation between the people, who pass CFA examination and job prospects, and job satisfaction. Keeping this ambitious goal in mind, representative data was gathered and studied for the existence of a positive correlation between the people, who pass CFA examination and job prospects or so called "job satisfaction".

Object: Kazakhstan citizens who passed a CFA examination. The sample in research is 60 participants. The 30 were those who passed the CFA exam and 30 who have MBA degree only. Firstly, researchers are going collect data from people, who have passed CFA examination in Kazakhstan. The survey will be based on questionnaire. Thereby it can found if there is a positive correlation between people, who had passed CFA examination and job career so that employer while deciding if to pass or not, moreover they would know whether it will increase the possibility of higher salary where he or she wants so that he or she will be satisfied. Based on gathered data regression coefficients are calculated and finally conclusion made if there is a positive correlation between the participation in the CFA examination and job satisfaction [2].

The mission of CFA Institute is served by generating value for core investment management professionals and engaging with the core investment management industry to advance ethics, market integrity, and professional standards of practice, which collectively contributes value to society. CFA Institute seeks to set professional standards for investment management practitioners and broadly engage other finance professionals through their interest and interactions with the investment management industry. Improving outcomes for investors advances the social mission and benefits members through greater demand for educated and ethical investment management professionals. Investment professionals contribute to the ultimate benefit of society through the sustainable value generated by efficient financial markets and by effective investment institutions.

In statistical modeling, regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps one understand how the typical value of the dependent

variable changes when any one of the independent variables is varied, while the other independent variables are held fixed [3].

A hypothesis test is a statistical test that is used to determine whether there is enough evidence in a sample of data to infer that a certain condition is true for the entire population.A hypothesis test examines two opposing hypotheses about a population: the null hypothesis and the alternative hypothesis. The null hypothesis is the statement being tested. Usually the null hypothesis is a statement of "no effect" or "no difference". The alternative hypothesis is the statement you want to be able to conclude is true [4].

In statistics, linear regression is an approach for modeling the relationship between a scalar dependent variable *y* and one or more explanatory variables (or independent variables) denoted *X*. The case of one explanatory variable is called simple linear regression [5].

The research article was undertaken in order for employees and future job candidates in finance field of Kazakhstan to assess whether or not CFA examination would be useful for their career. Through survey investigations this research wants to test hypothesis and discover new relationship between job satisfaction and CFA[6,7]. In this research deductive approach is used. It has been stated that "deductive means reasoning from the particular to the general. If a causal relationship or link seems to be implied by a particular theory or case example, it might be true in many cases. A deductive design might test to see if this relationship or link did obtain on more general circumstances". The article began with building up a theory about the topic of the interest. Then narrowed that down into more specific hypotheses that can be tested.

Firstly, data was collected from people who have passed CFA examination in Kazakhstan. The survey will be based on the questionnaire and the sample of 30 people with CFA certificates is chosen through simple random sample. Based on the gathered data regression coefficients are calculated and a conclusion was made by following the assumption if there is a positive correlation between the participation in the CFA examination and job prospects.

All those methods/techniques that are used for conduction of research are explained. As it was written before, with implementation of deductive approach the primary data for research is collected through survey. Specifically, data was obtained by electronically mailing of questionnaires: Kazakhstan citizens who had certificate of CFA through LinkedIn, Google, and VK as well as from center for preparation for CFA in Almaty were found. 30 CFA holders were randomly chosen from these people and contacted each member via phone and e-mail as well as asked a permission to send them questionnaires and use their answers for future investigations. All of the 30 respondents replied with positive answer.

Also, from the list of Kazakhstan employers in finance field who are not CFA holders, 30 people were chosen by simple random sample. Questionnaires are mailed to the respondents with a request to return after completing the same. In this method every units in target population have equal chances of being selected.

First of all, theory that the level of satisfaction is influenced by wages should be introduced and show that levels of satisfaction between participants and non-participants are different. This is, of course, true but additional proof should be made. In order to prove this, correlation coefficient between two variables should be determined: the first is level of income and the second is level of satisfaction. The level of income, undoubtedly, is independent variable and the level of satisfaction is dependent one. Let X be the level of income and Y be the level of satisfaction, which will be more convenient in further analysis. Having the data about level of income and level of satisfaction correlation coefficient can be determined. Two independent scatterplots are drawn, one with level of income of those who passed CFA, and the other with those who did not passed.

Here are obtained histograms:
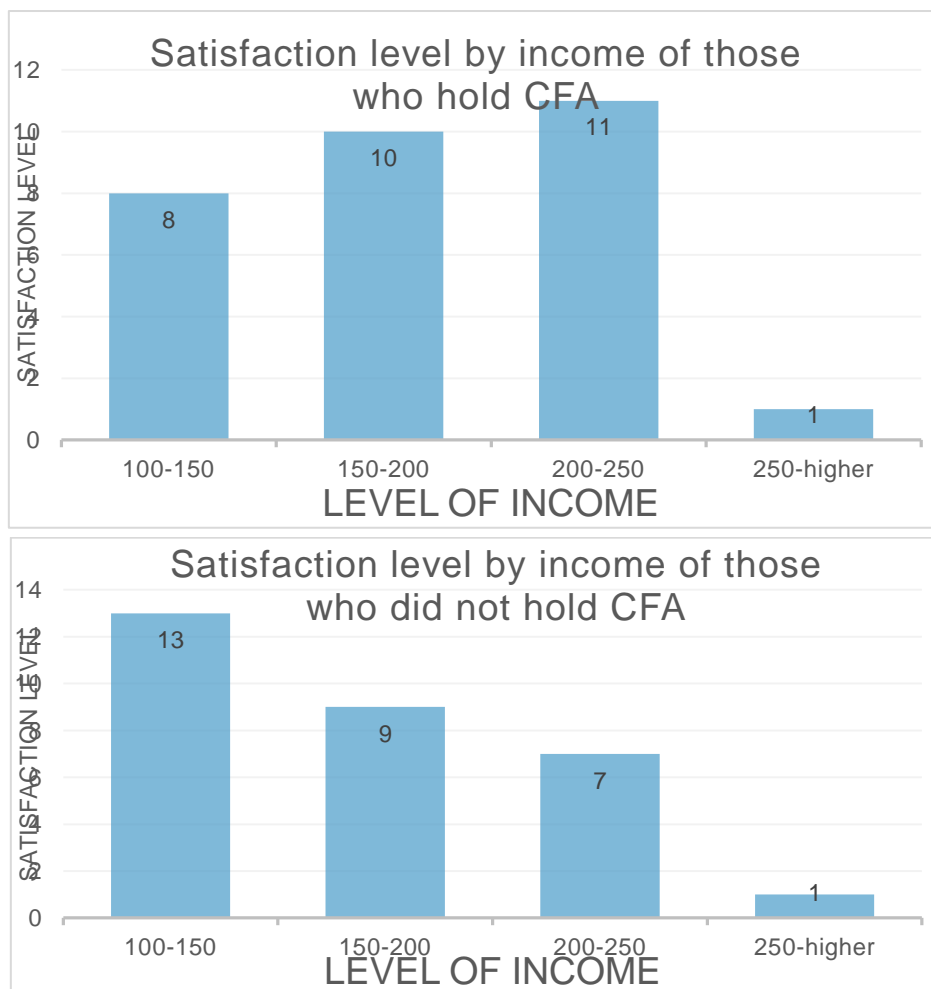
Regression line was calculated for those who did not participated in CFA at first. In this case, $\bar{x}$ equals to 163.167, $\bar{y}$ equals to 5.76, by using formulae:

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}, \text{ and the same for y.}$$

So, the calculated correlation coefficient is 0.5510, which means that there is moderate positive correlation between level of income and satisfaction level. However, correlation does not mean causation. But as the correlation coefficient is close to 0.5, linear model is appropriate for this case.

Regression analysis is the derivation of the linear regression line. The formula:

$$\hat{y} = a + b\square \qquad (1)$$

It is known that x is independent variable, but to determine y, it must estimated the slope of the regression line (b) and y-intercept (a). In order to do it, researchers used following formulas:

$$b = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{n}(x_i - \bar{x})^2} \qquad (2)$$

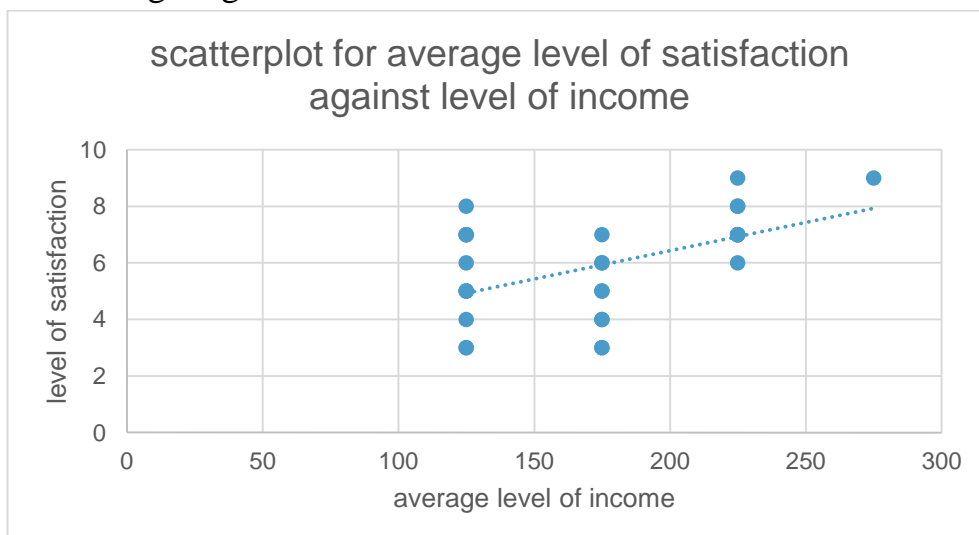Making all necessary calculations, the slope is equal to 0.0222

The interpretation of it is the following: with every additional increase in the level of income the level of satisfaction increases on 0.0222 on average.

Now, y-intercept is calculated: A=5.76-0.0222*163.167 A=2.0269

This number tells about the value of y, when x equals to 0. In other words, it shows the level of satisfaction when the level of income equals to zero. It is 2.0269 for non-participants. The regression line is

$$\hat{y} = 2.0269 + 0.0222x$$

The following diagram shows linear trend between X and Y.

For those who participated $\bar{x}$ equals to 184.167, $\hat{y}$ equals to 8.2. So, the calculated correlation coefficient is 0.6507, which means that there is moderate positive correlation between level of income and satisfaction level for those who have CFA

Making all necessary calculations from (1) and (2), researchers identified the slope which is equal to 0.02309. The interpretation of it is the following: with every additional increase in the level of income the level of satisfaction increases on 0.02309 on average. Now, calculate y-intercept:

A=8.2-0.02309*184.167   A=2.88195

The regression line is

$$\hat{y} = 2.88195 + 0.02309x$$

The following diagram shows linear trend between X and Y.

scatterplot for average level of satisfaction against level of income
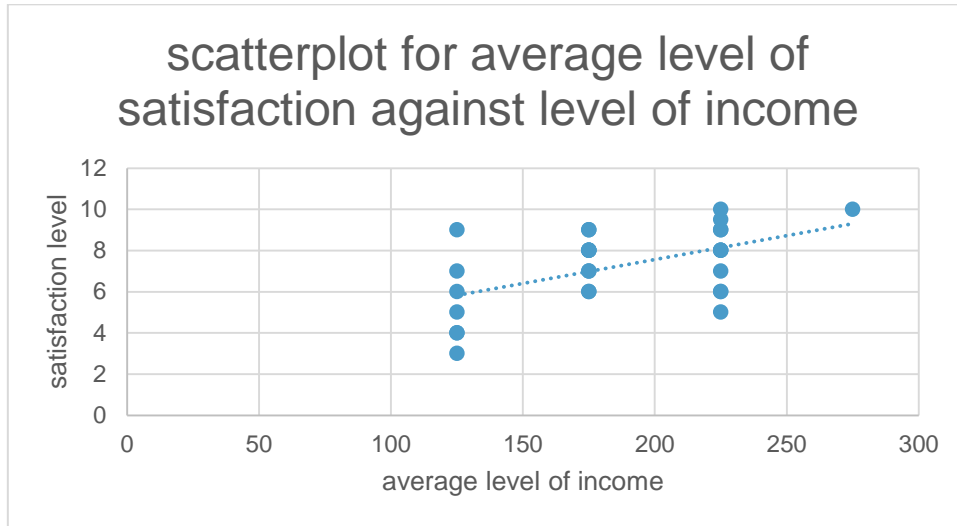
The result is that people who hold CFA certificate have, on average, 0.5 more level of satisfaction than those who did not participate.

Hypothesis testing. As mentioned before in order to prove the prediction it is needed to know average satisfaction level of employees who were holding CFA certificate and of employees who did not participated in this examination.

Employees, who:	Sample size	Average satisfaction level (max=10)	Satisfaction sample standard deviation	Average income level(in tg)	Income sample standard deviation(in tg)
Have CFA	30	8.2	1.27035	184167	45714.3178
Don't have CFA	30	5.733	1.6174	169167	47198.8335

For employees' satisfaction level :

H_0: $\mu_t = \mu_n$

H_a: $\mu_t > \mu_n$ where:

μ_t - average satisfaction level of employees who have CFA certificate;

μ_n - average satisfaction level of employees who doesn't have CFA certificate;

Make an assumption that true mean difference of average satisfaction level is equal to μ_d=0 and x_d=8.2-5.7333=2.4667. Formula for t-statistic is following which is provided by J. Abdey:

$$t = \frac{x_d - \mu_d}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \sim t_{n_1 + n_2 - 2} \qquad (3)$$

One-tailed test was conducted since predicted average satisfaction level of employees who have CFA is higher.

So, *test*- statistic = 6.56929

Firstly test at significance level of 5%. The critical value for t at α=0.05 and df=58 is $t_{0.05, 58}$ =1.671

Test statistic is more than t-score at α=0.05, so "reject null hypothesis which claims that average satisfaction level of two types of employees' is indifferent".

Test at smaller significance level, which is equal to 1%. At α=0.01 and df=58 the critical value for t is $t_{0.01, 58}$ = 2.390. Again "we reject the null hypothesis". Therefore, it can be concluded that the results are highly significant to reject the null hypothesis, which state that average satisfaction level of employees' who hold CFA certificate and who did not hold CFA certificate are indifferent.

For income level:

H_0: $\mu_t = \mu_n$

H_a: $\mu_t > \mu_n$ where:

μ_t - average income level of employees who have CFA certificate;

μ_n - average income level of employees who did not have CFA certificate;

Making assumption that true mean difference of average income levels is equal to μ_d=0 and x_d=184,167-169,167=15000. Using formula (3) t-statistic = 1.25

Since test statistic < critical t-value at α=0.05 the null hypothesis is failed to reject. Testing at higher significance level, which is equal to 10%: $t_{0.1,58} = 1.296$

Again at α=0.1 the null hypothesis is failed to reject, which claims that average income level of employees of different types is indifferent. Finally, researchers got two extreme results from tests. The one is not significant at all, while the other is highly significant. It shows that regression analysis may work quite well with the data set where correlation coefficient is quite big and may not work with data set where correlation coefficient is relatively low. However, the reason of failing to reject the indifference of average wages may be explained by the fact that wage is large but not last cause for satisfaction. Actually, majority of their wage is bounded to tenge and recently Kazakhstan national currency devaluated [10].

The primary goal of this research was to identify the existence of correlation between having CFA certificate and jobs' prospects. By doing inference analysis, that

is regression analysis and hypothesis test it could be proved that having CFA certificate influence work prospects.

There can be many explanations why such results are obtained. Firstly, it may be explained by the fact that CFA increasing its credibility in Kazakhstan and considered as more qualified certificate than MBA. From scatterplot it can be seemed that there are apparent linear relationships between two variables, which make test results significant.

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