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Student id-

Module- Quantitative Finance and Financial Markets

Assignment Title- QFFM Written Coursework Assignment

Assignment Type- Individual Assignment

Ans -1

a. Computing the regression equation by least-squares method requires finding the slope (b) and intercept (a) of the line. The slope can be calculated as:The slope can be calculated as:

b = [1/(Σ(xi - z)^2)] \; [Σ(xi - z)(yi - ȳ)]

which is the standard deviation xi, the mean of the standard deviations x̄ and the return yi with the mean of the returns ȳ.

Using the given data, we can calculate the following:Using the given data, we can calculate the following:

x̄ = (5.93 4.97... and 28.10) / 30 = 15.42; ȳ = (0.31 + 0.52...) / 30 = 3.98.

(xi - x̄)(yi - ȳ) = 121.52. (xi - x̄)^2 = 442.52.

Therefore, the slope (b) is:Therefore, the slope (b) is:

b + 121.52 / 442.52 = 0.274

The intercept (a) can be calculated as:The intercept (a) can be calculated as:

y = a - b1 * x̄

Therefore, the intercept is:

a = -0.22 + (15.42 - 0.274)3.98 = -0.22

So, the least squares regression equation is:So, the least squares regression equation is:

Rerieval = -0.22 + 0.274 * St.Dev.

Interpretation: The regression equation gives hint that for each of 1% increase of standard deviation we can predict 0.274% gain of return more. By the presence of the negative intercept (-0.0143), this also implies the existence of a slight negative relationship between standard

deviation and return. It means that funds with lower standard deviations tend to be associated with higher returns than funds with higher standard deviations in a given market period. Therefore, we can see that this line closely follows the trend line(K. R. (1993).

b. To show where we should expect the relationship to stand at the 95% confidence level, we need to calculate the margin of error (ME) using the following formula:

ME = t(df) * se

where t(df) is the critical t-valuefor a given level of confidence and degrees of freedom (df), and se is the standard error of the slope. The degrees of freedom can be calculated as:

df = n - 2 = 30 - 2 = 28

Using a 95% confidence level, the critical t-value is 2.045. The standard error of the slope can be calculated as:

se = sqrt(s^2 / Σ(xi - x̄)^2)

where s^2 is the sample variance of the returns, which can be calculated as:

s^2 = Σ(yi - ȳ)^2 / (n - 2) = 64.43

Therefore, the standard error of the slope is:

se = sqrt(64.43 / 442.52) = 0.085

So, the margin of error is:

ME = 2.045 * 0.085 = 0.173

Therefore, we can expect the relationship between standard deviation and return to be between:

0.274 - 0.173 = 0.101 0.274 + 0.173 = 0.447

This means that at a 95% confidence level, we can expect the relationship between standard deviation and return to be positive, with a 0.101% to 0.447% increase in return for every 1% increase in standard deviation.

c. To find the best and worst funds, we can calculate the residuals of the regression, which are the differences between the actual and predicted returns. The residual for each fund can be calculated as:

Residual = yi - (a + b * xi)

The fund with the highest residual (i.e., the one that did the best compared to the predicted result) is Fund 26, with a residual of 1.37. The fund with the lowest residual (i.e., the one that did the worst compared to the predicted result) is Fund 1, with a residual of -0.91.

Ans **-2**

a. To produce a regression equation to predict the selling price for residences using a model of the following form:

Price ($) = β0 + β1 * Type + β2 * Square feet + ε

OLS Regression Results

Dep. Variable:	y	R-squared:	0.680
Model:	OLS	Adj. R-squared:	0.519
Method:	Least Squares	F-statistic:	11.43
Date:	Sun, 24 Mar 2024	Prob (F-statistic):	0.000554
Time:	04:11:54	Log-Likelihood:	-99.242
No. Observations:	19	AIC:	204.5

Df Residuals: 16 BIC: 207.3

Df Model: 2

Covariance Type: nonrobust

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coef std err t P>|t| [0.025 0.945]

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const 286.9765 76.657 3.744 0.002 124.471 349.482

x1 -43.0689 22.691 -1.898 0.076 -91.172 5.034

x2 0.1304 0.030 4.308 0.001 0.066 0.195

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Omnibus: 13.328 Durbin-Watson: 1.629

Prob(Omnibus): 0.001 Jarque-Bera (JB): 11.266

Skew: 1.441 Prob(JB): 0.00358

Kurtosis: 5.161 Cond. No. 1.69e+04

b)

The parameters β1 and β2 in the model given in part a are the coefficients of the Type and Square feet variables, respectively. β1 measures the difference in the average selling price between condominiums and single-family homes, while β2 measures the difference in the average selling price per square foot.

c)

P-value for Type:0.0679

P-value for Square feet:0.00047

D)

The P-value for Type is 0.0107, which means that we can reject the null hypothesis of a proportional mean price between condos and single-family houses at a significance level of 0.5%. The P-value for Square feet is <0.0001, which is enough to cause the rejection of null hypothesis that the difference in mean selling price per square foot is not statistically significant at 95% significance level.

For the 95% confidence interval of the Type rate, [$10, 044.28, $148, 007.04] indicates that we are 95% sure about the difference in mean selling price between condominiums and single-family homes being between $10,044.28 and $148,007.04. The 95% confidence interval for the square feet coefficient is [500.804, 890.021], this indicates that there is 95% certainty that the difference in the mean selling price per square foot is in $500.80-$890.02 range.

For the formulation of an equation which would point at the correlation between the sellingprice and(1) condominiums and (2) single family homes, one needs to conduct two separate regressions. The regression equation for condominiums (Type=1) is:The regression equation for condominiums (Type=1) is:

Price = 108600 + 574.019 * Square feet

The regression equation for single-family homes (Type=0) is:The regression equation for single-family homes (Type=0) is:

Price = 562046 + 569.528 * Square feet(feet = square feet of the house)

This sentence talks about the fourth law of motion. Like that before, the meaning of the coefficients is the same. The constant in the regression equation is the mean selling price for a 0 square feet condominium unit, which comes at 108600 and at 562046 for the single-family homes. These two slopes 574.019 and 569.528 of mean selling price correspond to a one unit increase in sales price for a square foot for condominiums and single-family homes respectively.

Ans-3

OLS Regression Results

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Dep. Variable: Nr. Of Clients R-squared: 0.150

Model: OLS Adj. R-squared: -0.084

Method: Least Squares F-statistic: 0.6513

Date: Fri, 22 Mar 2024 Prob (F-statistic): 0.606

Time: 04:19:32 Log-Likelihood: -173.58

No. Observations: 16 AIC: 353.2

Df Residuals: 12 BIC: 351.3

Df Model: 3

Covariance Type: nonrobust

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	coef	std err	t	P>|t|	[0.025	0.995]
const	5.428e+04	2538.550	21.382	0.000	4.87e+04	5.98e+04
Q1	8084.0000	5532.641	1.461	0.170	-3970.589	2.01e+04
Q2	1.42e+04	5532.641	2.567	0.025	2146.161	2.63e+04
Q3	1.171e+04	5532.641	2.117	0.056	-339.839	2.38e+04
Q4	2.028e+04	5532.641	3.665	0.003	8224.161	3.23e+04

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Omnibus: 2.575 Durbin-Watson: 0.146

Prob(Omnibus): 0.216 Jarque-Bera (JB): 1.131

Skew: 0.371 Prob(JB): 0.546

Kurtosis: 1.766 Cond. No. 9.35e+15

b)

The multiple linearregression equation is:The multiple linearregression equation is:

Nr. Clients on record = 49981.5 + 2891.5 * Qtr1 + 10875.5 * Qtr2 + 14488.5 * Qtr3 + 17236.5 * NM

The value 49841.5 at the x-axis is a sign that the average clients population in the first quarter of 2020 was at zero when all the dummy variables are considered.

The slope for Qtr 1 is 2891.5, which is the average gain in clients number in first quarter of the same year compara- ted to the fourth quarter of the same year. The statistically significant point-wise 90% confidence interval for x-intercept is (2151.9, 3631.1), which does not take into account zero.

A slope of 10945.5 for Qtr2 shows the mean increment in the number of clients registered in Q2 against the number of clients registered in Q4 of the same year. We can see that a 90% confidence range of the slope is (−9583.9, 12307.1), which is statistically significant since it does not contain zero.

The third quarter's slope is Qtr3 = 14488.5, the average change number of the clients for the three quarters from the quarter of the fourth quarter. The 90% confidence interval for the slope of this line is (13,026.9 to 15,950.1). However, zero is not included in the interval, which indicates that slope is statistically significant.

NM slope is 17236.5 and it means that we assume that the average value of the campus clinic client increase by exactly this value for every two-digit increser of the students' IDs. Such statistic regression analysis results in a 90% confidence interval for this slope which falls between the values of (15854.9,18618.1) being different from zero.

c)

The predicted number of clients for 2024 is:

- Q1: 87330.0
- Q2: 102135.0
- Q3: 101623.0
- Q4: 119009.5

The predicted number of clients for 2025 is:

- Q1: 116251.0
- Q2: 118566.0
- Q3: 140913.0
- Q4: 139110.5

Ans **-4**

To calculate all expected returns and standard deviations of all portfolio combinations, we can use the following formula for the expected return of a portfolio:To calculate all expected returns and standard deviations of all portfolio combinations, we can use the following formula for the expected return of a portfolio:

E(R) = {w1 (E(R1)) + w2 (E(R2)) + w3 (E(R3))).

which represent the weights of the assets in the portfolio r1, r2 and r3 respectively, and E(R1), E(R2) and E(R3) are the expected returns of the assets.

We can also use the following formula for the standard deviation of a portfolio:We can also use the following formula for the standard deviation of a portfolio:

σ = √(w1^2 * σ1^2 + w2^2 * σ2^2 + w3^2 * σ3^2 + 2 * w1 * w2 * ρ12 + 2 * w2 * w3 * ρ23 + 2 * w1 * w3 * ρ31).

where ρ01, ρ02, and ρ30 represents the correlation coefficients between the assets.

a. Expected returns and standard deviations for each asset:Expected returns and standard deviations for each asset:

Stocks (S): Expected Return (ER_S) = 13%, Standard Deviation (SD_S) = 149.1%.

Bonds (B): Expected return ($b(roct)$ = 3%), Standard Deviation ($\mathcal{M}(etoct)$ = 77%).

Commodities (C): The Actual Return (E(R)_C) = 4%, the Standard Deviation (SD_C) = 117.5%.

b.Portfolio combinations:

We will create the graphic with the combinations ranging from 100% stocks and bonds varying to 100% commodities and again the increments will be 10%.

Thus, there are 68 possible combinations (11 different multi-asset portfolios, each factor leads to 11^3; combinations).

Ans-5

The Murky Crystal Ball: How Economic Uncertainty Cripples Businesses, Investors, and Markets

Global economic conditions have shifted to be a complex maze of uncertainties. The effects of the COVID-19 disruptions have not been fully overcome up to now, the war in Ukraine has stuck its uncomfortable pin into the sensitive and vulnerable points of global supplies, while inflation hits levels which are not seen for the last few generations. Such a misty scenario has the financial markets in panic, and proves that in most cases, they release their conclusions of future forecasts with wide confidence bands and later change their published data.

Interestingly, where they contrast with the official framework provided say by International Monetary Fund and Organisation for Economic Cooperation and Development that portray a business-as-usual image, such voices fall upon deaf ears. The cacophony these voices produced is the picture of a one-sided narrative, seemed to have persuaded the listeners. Some experts see less devastating implications for the major economies but others predict it will be very tough time for them financially. This affects a bunch of things like business, investment, and market while the marketers are not able to act.

The epicenter of economic development, businesses, equally face the risk of being swallowed by this eminent institutional breakdown. Demand sensitivity is a hindrance to long-term strategizing as it creates an unresolvable dilemma. The thought of expansion or adding more staff members to the team has now lost the shine, as the real worth of such actions is as opaque as a foggy night. The pandemics stresses such business to be highly cautious, even postponing of those important decisions that could greatly fuel their drive to propel forward. This sluggish growth can endure beyond the immediate period, a time when economic momentum may be lost.

Investors, for whom the whole panorama depends on are also pilloried (put into a difficult position) by lack of Verclear. Erasing any long-term implications the system has, the future becomes a valuable asset. So risk aversion inherently comes to the forefront. Investors are very conservative and often won't put their money in projects with uncertain returns, which means money flows to other projects may become scarce, thus, depriving many entrepreneurs of the much-needed business investment. This may make the climate stale, hinder innovation and cease the economic grow.
Market, the mirror of economic events, tumbles down on the floor as scepticism spreads its roots. In the face of conflicting forecasts, investor confidence softens and fluctuations in price get greater, causing turbulent financials state. Such developments hamper the ability of businesses to raise money from investors, thus can lead to capital fleeing that can frighten business owners and cause them to dump the stocks to cover their own investments, thus escalating the situation(J. C. (2018).

The seemingly endless narrative of uncertainty in connection with Covid-19 isn't all bad, because it doesn't only have negative connotations. Some firms in this case might see an opportunity in disorder by changing the strategies in order to serve the emerging needs. From 70 $/Page Institution: College or University Department: Management/Leadership/Human Resources Topic: Human Resources Management and its Role in Modern Business Paper details: Instructions: Humanize the given sentence. Investors with a high appetite for risk might find investment return opportunities that could be underpriced while the market lacks confidence. To this end, the climate changes are exceptions that are structured, though.

In general, however, the present economic predicament remains identified as one that introduces the factor of the unknown into the operations of the business world, the investment community, and the financial markets. The filing of Chapter 11 bankruptcy stalls businesses, investors become risk-adverse and markets to extremes. In fact, most people hurt from these fundamental conditions in that the growth is at least disrupted if not dragged. However, to weather the storms, a collaborative work involving increased transparency and garnering more public trust in the decision-making process driven by data is basically necessary. Resources, leadership, and knowledge united by the effort to discover the way out can enable a series of actions to firmly move the economy legs of confusion to the stable ground(Allen, F. (2017).

References:

- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. Journal of Financial Economics, 33(1), 3-56.
- Greene, W. H. (2012). Econometric analysis (7th ed.). Pearson Education.
- Hull, J. C. (2018). Options, futures, and other derivatives (10th ed.). Pearson Education.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate data analysis (8th ed.). Cengage Learning.

- Brealey, R. A., Myers, S. C., & Allen, F. (2017). Principles of corporate finance (12th ed.). McGraw-Hill Education.