

Quantitative methods analysis essay



**ASSIGN
BUSTER**

Contents

- Index of economic system

Recognition

On top of that thanks to My GOD " the Godhead of everything " . Secondly my Parents whose unobserved supplications and encouragements fuelled me. My instructors & A ; ' who made me from a grain of sand toward the bounds of skyline " . Motivations of my Brother (Usman) who has supported me all the manner long. My Friendless Brother Zunnorain has ever been a charming chap. My sister by giving me love, stating everlastingly Do n't Worry. Intentionally, I am non adverting one really of import individual for me here, any manner thanks.

Thanksall of you being our protagonists.

Given Datas

	Yttrium	X2	X3	X4
Time	(Gross saless)	(Prise)	(Marketing)	(Index)
1	986	1.8	0.4	100
2	1025	1.9	0.4	103
3	1057	2.1	0.5	104
4	1248	2.2	0.7	106
5	1142	2.2	0.6	102
6	1150	2.3	0.7	103

7	1247	2.4	0.9	107
8	1684	2.2	1.1	108
9	1472	2.3	0.9	108
10	1385	2.5	1.1	107
11	1421	2.5	1.2	104
12	1210	2.6	1.4	99
13	987	2.7	1.1	97
14	940	2.8	0.8	98
15	1001	2.9	0.7	101
16	1025	2.4	0.9	104
17	1042	2.4	0.7	102
18	1210	2.5	0.9	104
19	1472	2.7	1.2	107
20	1643	2.8	1.3	111

Meanss of The given informations

$\sum Y/20 = 1217.35$

$\sum X^2/20 = 2.41$

$\sum X^3/20 = 0.875$

$\sum X^4/20 = 103.75$

Activity 1

Question I:

From the Data provided, cipher the additive multiple arrested development equations for those points that influence gross revenues?

Solution:

There are so many computations are involved for this inquiry and most of the computations has been done with the aid of computing machine bundles including PASW and Spread sheet. Data has been taken from these computations and set it here in the same format.

Linear Multiple Regression equations for gross revenues and prise.

First we will take prise as independent variable and sale as dependant

$$Y - Y' = \frac{\sum (X - X')^2}{\sum (X - X')^2 + \sum (Y - Y')^2} \left[\sum (X - X')(Y - Y') \right]$$

-0.61 -231.53522. 0.3721 141.1235

	35	8225	
-0.51	-192.35	36998.5225	0.260198.0985
-0.31	-160.35	25712.1225	0.096149.7085
-0.21	30.65	939.4225	0.0441-6.4365
-0.21	-75.35	5677.6225	0.044115.8235
-0.11	-67.35	4536.0225	0.01217.4085
-0.01	29.65	879.1225	0.0001-0.2965
-0.21	466.65	217762.2225	0.0441-97.9965
-0.11	254.65	64846.6225	0.0121-28.0115
0.09	167.65	28106.5225	0.008115.0885
0.09	203.65	41473.3225	0.008118.3285
0.19	-7.35	54.0225	0.0361-1.3965

0.29	-230.53061.	0.0841-66.8015
	35 1225	
0.39	-277.76923.	0.1521-108.1665
	35 0225	
0.49	-216.46807.	0.2401-106.0115
	35 3225	
-0.01	-192.36998.	0.00011.9235
	35 5225	
-0.01	-175.30747.	0.00011.7535
	35 6225	
0.09	-7.35 54.0225	0.0081-0.6615
0.29	254.64846.	0.084173.8485
	65 6225	
0.39	425.181177.	0.1521166.0035
	65 9225	

Calculations(Gross saless and Prise)

Formula **Consequence**

& A ; amount ; (Y-Y & A ;
971124.55
 macr ;) & A ; sup2 ;

& A ; amount ; (X-X2 & A ; 1.658

$\sum (Y - \bar{Y})^2$;

$\sum (X - \bar{X})^2$; $\sum (Y - \bar{Y})^2$; $\sum (X - \bar{X})(Y - \bar{Y})$;
 173.33

$\sum (X - \bar{X})^2$; $\sum (Y - \bar{Y})^2$; $\sum (X - \bar{X})(Y - \bar{Y})$;

$B = \frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sum (X - \bar{X})^2}$ = $\frac{104.}{5416164}$

$\sum (X - \bar{X})^2$; $\sum (Y - \bar{Y})^2$; $\sum (X - \bar{X})(Y - \bar{Y})$;

$a = \frac{\sum (Y - \bar{Y}) - b \sum (X - \bar{X})}{n}$ = $\frac{4047045}{965}$

R (Correlation coefficients) = $\frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$ = 0.136597895

$\sum (X - \bar{X})^2$; $\sum (Y - \bar{Y})^2$; $\sum (X - \bar{X})(Y - \bar{Y})$;

$\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}$; $\sum (X - \bar{X})(Y - \bar{Y})$;

$Y = a + bX^2$

The equation for sale and Price will be

$$Y = a + bX^2$$

$$Y = 965.404 + 104.541 X^2$$

Here by setting the value of X^2 we can acquire the predicted value of Y (Sale).

Correlation and Graph:

$R = 0.136$ the relation between sale and price is neither really strong nor really weak but of class there is some relation. As the value is more than ± 0.5 so its tendency is toward positive. We besides know that if $r^2 = 1$ so explained and entire fluctuation are equal and unexplained variation = 0. The graph given below demoing heteroscedasticity because all the variable do not hold finite discrepancy.

Linear Multiple Regression equations for gross revenues and Selling.

First we will take Marketing spend as independent variable and sale as dependant

$$Y - Y' = \frac{\sum (X - X')^2}{\sum (X - X')^2 + \sum (Y - Y')^2} \left[\sum (X - X')(Y - Y') \right]$$

$$= \frac{-231.53522}{-0.475^2 + 53522} \cdot 0.109$$

$$= \frac{35 \cdot 8225}{225625 + 89125}$$

$$= -0.475 \cdot \frac{36998}{0.475^2 + 91.36625}$$

	35	5225	225625	
	-160.	25712.	0.	
-0.375				60.13125
	35	1225	140625	
			0.	
-0.175	30.65	939.4225		-5.36375
			030625	
	-75.	5677.	0.	
-0.275				20.72125
	35	6225	075625	
	-67.	4536.	0.	
-0.175				11.78625
	35	0225	030625	
			0.	
0.025	29.65	879.1225		0.74125
			000625	
	466.	217762.	0.	104.
0.225				
	65	2225	050625	99625
	254.	64846.	0.	
0.025				6.36625
	65	6225	000625	
	167.	28106.	0.	
0.225				37.72125
	65	5225	050625	
	203.	41473.	0.	
0.325				66.18625
	65	3225	105625	
0.525	-7.35	54.0225	0.	-3.85875

275625

0. 225 -230. 53061. 0. -51. 82875
35 1225 050625

-0. 075 -277. 76923. 0. 20. 80125
35 0225 005625

-0. 175 -216. 46807. 0. 37. 86125
35 3225 030625

0. 025 -192. 36998. 0. -4. 80875
35 5225 000625

-0. 175 -175. 30747. 0. 30. 68625
35 6225 030625

0. 025 -7. 35 54. 0225 0. -0. 18375
000625

0. 325 254. 64846. 0. 82. 76125
65 6225 105625

0. 425 425. 181177. 0. 180.
65 9225 18062590125

Calculations(Gross saless and Selling)

Formula	Consequences
----------------	---------------------

$\frac{\sum (Y - \bar{Y})^2}{n}$	971124. 55
----------------------------------	------------

$\frac{\sum (X - \bar{X})^2}{n}$	1. 6175
----------------------------------	---------

$\frac{\sum (Y - \bar{Y})(X - \bar{X})}{n}$	796. 875
---	----------

=

$\frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$	492. 6584235
--	--------------

=

$a = \bar{Y} - b\bar{X}$	786. 2738794
--------------------------	--------------

A ; macr ;) =

R (Correlation coefficients) 0. 635814738

=

$\frac{\sum (X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum (X - \bar{X})^2 \sum (Y - \bar{Y})^2}}$
--

 ----- =

\sqrt{A} ; amount ; ($X-X^3$ &
 A ; macr ;) & A ; sup2 ; * &
 A ; amount ; ($Y-Y$ & A ; macr
 ;) & A ; sup2 ;

The equation for sale and Price will be

$Y = a + bX$

$Y = 786.273 + 492.658 \text{ Ten}$

Here by setting the value of X we can acquire the predicted value of Y (Sale)

Correlation and Graph:

$R = 0.6358$ the relation between sale and selling is strong. As the value is near to $\& A ; \text{lsquo} ; 1$ ' so its tendency is towards strong positive.

Linear Multiple Regression equations for Gross saless and Index of Economy

Here we will take Index of Economy as independent variable and sale as dependant

	$\& A ;$	$(X-X^4$	$(X-X^4$	$\&$
$X-X^4$	$Y-Y$	$\&$	$\& A ;$	$A ;$
$\& A ;$	$A ;$	$Y-Y$	$\& A ;$	$\text{macr} ;$
$\text{macr} ;$	$\text{macr} ;$	$\text{macr} ;$	$\text{macr} ;$	$\text{macr} ;$
	$\& A ;$	$Y-Y$	$\& A ;$	$\text{macr} ;$
	$\text{sup2} ;$	$\text{sup2} ;$	$\text{macr} ;$	$\text{macr} ;$
	-231.	53522.	14.	
-3.75				867.5625
	35	8225	0625	

-0.75 -192. 36998. 0.5625 144. 2625
35 5225

0.25 -160. 25712. 0.0625 -40. 0875
35 1225

2.25 30. 65 939. 4225 5. 0625 68. 9625

-1.75 -75. 5677. 3.0625 131. 8625
35 6225

-0.75 -67. 4536. 0.5625 50. 5125
35 0225

3.25 29. 65 879. 1225 10. 96. 3625
5625

4.25 466. 217762. 18. 1983.
65 2225 0625 2625

4.25 254. 64846. 18. 1082.
65 6225 0625 2625

3.25 167. 28106. 10. 544. 8625
65 5225 5625

0.25 203. 41473. 0.0625 50. 9125
65 3225

-4.75 -7. 35 54. 0225 22. 34. 9125

5625

-6.75	-230.35	53061.1225	45.5625	1554.8625
-5.75	-277.35	76923.0225	33.0625	1594.7625
-2.75	-216.35	46807.3225	7.5625	594.9625
0.25	-192.35	36998.5225	0.0625	-48.0875
-1.75	-175.35	30747.6225	3.0625	306.8625
0.25	-7.35	54.0225	0.0625	-1.8375
3.25	254.65	64846.6225	10.5625	827.6125
7.25	425.65	181177.9225	52.5625	3085.9625

Calculations(Gross saless and Index of Economy)

Formulas Consequences

& A ; amount ; (Y-Y & A ;
 macr ;) & A ; sup2 ; = 971124. 55

& A ; amount ; (X-X4 & A ; 255. 75

$$\sum (Y - \bar{Y})^2 =$$

$$\sum (X - \bar{X})^2 =$$

$$\sum (Y - \bar{Y})(X - \bar{X}) = 12930.75$$

=

$$\sum (X - \bar{X})^2 =$$

$$\sum (Y - \bar{Y})(X - \bar{X}) =$$

B =

$$\frac{\sum (Y - \bar{Y})(X - \bar{X})}{\sum (X - \bar{X})^2} = 50.56011$$

--- =

$$\sum (X - \bar{X})^2 =$$

$$\sum (Y - \bar{Y})^2 =$$

$$a = \bar{Y} - b\bar{X} = 4028.26217$$

$$\bar{Y} =$$

$$R \text{ (Correlation coefficients)} = 0.820499702$$

=

$$\sum (X - \bar{X})^2 =$$

$$\sum (Y - \bar{Y})(X - \bar{X}) =$$

----- =

$$\text{Sqrt} \sum (X - \bar{X})^2 =$$

$$\sum (Y - \bar{Y})^2 =$$

$$\sum (Y - \bar{Y})(X - \bar{X}) =$$

;) & A ; sup2 ;

The equation for sale and Price will be

$$Y = a + bX^4$$

$$Y = -4028.26217 + 50.56011 X^4$$

Here by setting the value of X^4 we can acquire the predicted value of Y

(Sale)

Correlation and Graph:

$R = 0.8204$ and $r^2 = .6730$ mean 67 % of original fluctuation in sale has been explained. The relation between sale and economic system index is really strong. As the value of R is near to 1 so its tendency is towards strong positive. In my point of position and harmonizing to the observations this is the best fit line. The graph given below is expressions similar Homoscedasticity as variables are non holding a large discrepancy.

Note:

The line on the X and Y plane is getting down from the value of Y when X is 0 in the equation. On the other words it is the value of a . And this line passes through the point of $X = a/b$ and $Y = a$. Respectively for best fit line.

The analysis by PASW

Variables Entered/Removed

Mode	Variable	Variable	Method
1	Entered	Removed	Used

1 index, prise,
marketinga Enter

All requested variables entered and dependent Variable is gross revenues. This is demoing that the method is enter besides called coincident method. However there are some other methods like forward choice, backward choice and stepwise method

Model Summary

Model	R	Adjusted R Square	Std Error of the Estimate
1	.939a	.882	84.54356

Forecasters (Constants) are index, prise, selling. Adjusted R Square value tells us that our theoretical account histories for 88.2 % of discrepancy. A really good theoretical account

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig/p
-------	----------------	----	-------------	---	-------

	856762.			
		3		
Arrested	731		285587.	
		1		
development	114361.		577	39.
		6		000
Residual	819		7147.	956
		1		a
Entire	971124.		614	
		9		
	550			

Forecasters are) , index, prise, selling and dependant Variable are gross revenues. This tabular array reports an ANOVA, which assesses the overall significance of our theoretical account. As P & A ; It ; 0. 05 our theoretical account is important.

Coefficients

U

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Question II:

Using the consequences and any extra statistics you require, remark on whether the anticipations from your equation will give a good prognosis?

Solution:

There are so many methods for anticipation and forecasting including clip series, quantitative methods and some causal based. All have their ain pros and cons but harmonizing to the given inquiry we are working with the additive multiple arrested development analysis. We have given the 3 independent variables like prise, selling and index of economic system. By commanding the independent variables we can command the dependant variable which is sale here. The equations derived from the above informations are as given below.

$$Y = 965.404 + 104.541 X_2 \text{ (Prise)}$$

$$R = 0.136597895$$

$$Y = 786.273 + 492.658 X_3 \text{ (Marketing)}$$

$$R = 0.635814738$$

$$Y = -4028.26217 + 50.56011 X_4 \text{ (Index of Economy)}$$

$$R = 0.820499702$$

The above equations have been derived with the aid of computing machine package on possible degree of mistake free. They will give a good prognosis but remainders are ever in arrested developments which need to be purified by the aid fo typical methods.

Question Three:

In your commentary say what jobs you looked for in the consequences and statistics used to prove each job?

Solution:

1. Data is Limited to prove
2. The term & A ; Isquo ; ‘ Index of economic system ” has non been cleared.
3. There might be more factors set uping sale beside merely these three.
4. The values of Index of Economy are much higher than the prise and selling.
5. The value of & A ; Isquo ; ‘ a ” in marketing index is negative.

Activity 2:

Use the 2 variables that have the highest explanatory power and explain

Question 1:

How and why would you take them?

Solution:

There are many important trial that can be performed by taking the variable from a large set of available independent variables set uping the dependant variable. For each independent variable it is hypothesized that the true value of its coefficient is zero. A important trial is carried for each variable and if the hypothesis is rejected this variable must hold truly consequence on the dependant variable. And if the hypothesis is accepted so we can exclude the variable from he preparation.

Other trial can be carried out including multi co one-dimensionality in which more than one independent variables are extremely correlated and difficult to happen a the difference. They consequence on the dependant variable with about same extent. We can decide this by taking merely one if the variables or doing set of two variables or to replace one of the variables with a new variable independent of the other.

In the given inquiry the selling and the index of economic system are the variables with the higher explanatory values. These two independent variable have a large consequence on the sale and with the aid of coefficient correlativity, there is a strong relation between the variables. This is the ground that we have chosen these variables.

Question2.

What are the major jobs that arise in the usage of multiple arrested development techniques?

Solution:

Correlations of all variables in a matrix signifier.

s

Entire Number of Observations	Sale	prise	selling	Index of economic system
20				
	0.			
	1	1365	0.	0. 82049
Sale		9	63581	
	0.			
	1365	1	0.	-0. 0558
Prise		9	65643	
	0.	0.		
	6358	6564	1	0. 2741
Selling		1	3	
	0.			
	8204	-0.	0.	1
Index of economic system		9	0558	2741

1. That the relation between variables is additive is non ever true.
2. Premise that residuary are ever usually distributed. many trials are rather robust with respect to misdemeanors of this premise.
3. Determine relationship but ne'er gives a strong hint about causal mechanism.
4. No bounds of adding variables even we can set undistinguished variables
5. Multi carbon monoxide one-dimensionality

6. Suiting centred multinomial theoretical account. The adjustment of higher-order multinomials of an independent variable with a average non equal to zero can make hard multi co one-dimensionality jobs.
7. The Importance of Residual Analysis.