FINANIAL EVALUATION OF SHELL OIL COMPANY

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Abstract

To evaluate the composite composed of Shell-Oil Co. itself and its sub-sidiary companies, the acconnt data for 10 years from 1964 to 1973 was analyzed.

Before analyzing, the formula needed to it was deduced and by synthesizing the deduced formula, the price earning ratio (R) was computed as the ratio of the earnings to the value of company by means of computer calculation and the trial and error method. Resultantly the earning power (ic) was less than 5% ie. $R=17.03$.

So this company showed the normal company earnings and allotment from 1964 to 1968.

From 1968 to 1970, the allotment was increased but the earnings was decreased.

And in spite of the successive increase of the allotment from 1970 to 1973, the company showed that it was the stable and profitable one with stable increase of earnings.

In couclnsion, this company showed the stable trend of increase in the allotment of earnings and earnings itself.

I. Introduction

Evaluated first will be the average Company Earning Power indicated by past performance. Second, a method will be presented for the determination of the value of the company at any desired point in time in the available past history. It would be remembered that M by definition is the present value of all incomes yet to be derived from past investments, discounted at Company Earning Power of all past investments which still yield income. As thus defined, this "value" of a company does not necessarily represent a fair market value to a prospective invester or purchaser; rather, it should be thought of as an intermediate value, useful in the derivation of the relationships between income, dividends, and growth developed in this report. The prospective investor or purchaser is likely to be interested primarily in the value of future incomes discount at the particular earning rate which he wishes to achieve in his investments. The Ten year(1964~1973)Review of Financial Data of Shell Oil Company and Subsididary Companies was available to be evaluated according to above concept.

II. Theoretical Consideration (1)

The undiscounted value of a company for which the symbol A will be used is related to M by

$$M=D_1A,$$

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where D_1 is the deferment factor based on the Company Earning Power i. The real (market) value of the company denote by the symbol V, is arrived at by discounting future revenues (A) at the desired discount rate (i_c) and is given by

$$V=D_cA=\frac{D_c}{D_i}M,$$

where D_c is the deferment factor based on a discount rate i_c.

An evaulation of a company by the above described method is based on the following equations.

a) $i=\frac{g}{1-e}$ b) $E=(1-D_1)\,I$

c) $M=\frac{1-e+g}{g}E$ d) $A=\frac{M}{D_1}$

e) $V=\frac{D_c}{D_i}M$

It is not immediately possible to calculate the deferment factor D_c based on a specified discount rate i_c because its value depends on the income pattern of all future incomes. However, using the approximate equation previously discussed

$$\frac{(1-D_i)D_g}{D_g-D_i}=(\text{approx.})\frac{i}{i-g},$$

and replacing g and D_g by i_c and D_c gives as a close approximation the relation between D_c and the known factors i, D_i, and i_c:

$$D_c=\frac{iD_i}{iD_i+i_c(1D_i)}$$

Consequently, eauation (e) above may be replaced by

f) $$V=\frac{i}{iD_i+i_c\ (1-D_i)}M,$$

Combining equations (a) and (c),

$$M=\frac{1+i}{i}E$$

which substituted in equation (f) gives the value of the company in terms of a price earnings rate as follows

g) $$\text{Price/Earnings}=\frac{V}{E}=\frac{1+i}{iD_i+i_c(1-D_i)}$$

III. The data and calculations

The necessary state of thing for financial data from Ten year (1964–1973) Reviews of Financial Data of Shell Oil Company and Subsididary Companies (2) was given as follows.

Yrs	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
E/share	3.27	3.85	4.19	4.66	4.72	4.32	3.52	3.63	3.86	4.94
I/share	6.49	7.27	7.74	8.46	9.49	10.0	9.33	9.83	9.92	11.65
Div/shr	1.50	1.70	1.90	2.10	2.30	2.40	2.40	2.40	2.40	2.40

E/share total = 40.96 aver.E = 4.10
I/share total = 90.16 aver.I = 9.01
Div.shr. total = 21.5 aver. Div= 2.15
e=avre.Div/aver.E = 2.15/4.19 = 0.524

IV. Determination of Growth Rate and Market value of the Company

The trial and error method was adapted for the optimum shope of the company growth rate (g).

1) Least-squares by computer

By Computer Programing.

E_0 and E_{10} was obtained as follow:

$E_0 = 3.864727$ $E_{10} = 4.327273$

$E_{10}/E_0 = e^{10g} = 4.327273/3.864727 = 1.12$

$10g = \text{In}1.12 = 0.1133$ $g = 0.01133(1.13)$

Company growth: 1.13%

$i = g/(1-e) = 1.13/0.476 = 2.35\%$ (10 yrs average)

$D_i = (I-E)/I = (9.01-4.10)/9.01 = 4.91/9.01$

$= 0.545$

$M = (1+i)/i.E = (1+0.0235)/0.235 \cdot 4.10 = 178.568$

However,

It was impossible to get $\bar{n}$ by $D_i = 0.545$ and $i = 2.35\%$ using table 2 column III[3] Even though $\bar{n}$ could be obtained by interpolation method, the value of $\bar{n}$ is over than 45 years. And there was some deviation between the values of R(1st method) and R(2nd method). Consequently the slope obtained by computer was not useful to determine the company growth rate.

2) Actul slope between the lowest and highest values of E:

$E_0 = 3.27$ $E_{10} = 4.94$

$E_{10}/E_0 = e^{10g} = 4.94/3.27 = 1.51$

$\log = \text{In}1.51 = 0.412$

$g = 0.0412(4.12\%)$

Company growth: 4.12%

$i = g/(1-e) = 4.12/0.476 = 8.66$ (10 yrs average)

$Di = (I-E)/I = (9.01-4.10)/9.01 = 4.91/9.01 = 0.545$

$M = (1+i)/I \cdot E = (1+0.0866)/0.0866 \cdot 4.10$

$= 12.55 \cdot 4.10 = 51.44$

1st method,

$R = V/E = D_{(ic)}/D_i \cdot (1+i)/I = 12.55/0.545 \cdot D_{(ic)}$

$= 23.03D_{(ic)}$

2nd method,

$R = (1+i)/(iD_i + i_c(1-D_i)) = 1.0866/(0.0866 \cdot 0.545 + i_c(1-0.545)) = 1.0866/(0.0472 + 0.455i_c)$

$D_i = 0.545$ $i = 8.66 \fallingdotseq 9$

$\bar{n} = 16$ years using table 2 column III[3]

Comparison:

i_c(\$)	$D_{(ic)}$	R(1st method)	R(2nd method)
4	0.74274	17.105	16.615
5	0.69416	15.987	15.353
6	0.65038	14.978	14.586
7	0.61085	14.068	13.746
8	0.57505	13.243	12.998

these values were not effective to determine also because of value and R(2nd method).

But it was improved, tried again as next following.

3) Optimum slope

$E_0 = 3.40$ $E_{10} = 4.81$

$E_{10}/E_0 = e^{10g} = 4.81/3.40 = 1.415$

$10g = \mathrm{In}1.415 = 0.347$

$g = 0.0347$

Company growth: 3.47%

$i = g/(1-e) = 3.47/0.476 = 7.27$(10 yrs average)

$Di = (I-E)I = (9.01-4.10)/9.01 = 0.545$

$M = (1+i)/I.E = (1+0.0729 \cdot 4.10$

$= 14.72 \cdot 4.10 = 60.34$

1st method,

$$R = E/V = D_{(ic)}/D_i \cdot (1+i)/I = 14.72/0.545 \cdot D_{(ic)} = 27.01 \cdot D_{(ic)}$$

2nd method,

$$R = (1+i)/(iD_i + i_c(1-D_i)) = 1.0729/(0.0729 \cdot 0.545 + i_c(1-0.545)$$

$$= 1.0729/(0.04 + 0.455 i_c)$$

$D_i = 0.545$

$i = 7.27$

$\bar{n} \fallingdotseq 20$ years using table 2 column III(3)

Comparison:

i_c(%)	$D_{(ic)}$	R(1st method)	R(2nd method)
4	0.693	18.72	18.50
5	0.639	17.26	17.03
6	0.591	15.96	16.01
7	0.548	14.80	14.90
8	0.510	13.78	14.12

The difference between R(1st method) value and R(2nd method) value was shrinked and the patterns of each R values are nearly same. So that these values are useful.

Fig.1 is the presentations of the optimum slope for E and V.

Fig.2 is the visual observation for three different kinds of slope.

Fig.3 is the computer sheet for Least-square

4) Market value of company, V:

Yrs	1964	1965	1966	1967	1968	1669	1970	1971	1972	1973
E/share	3.27	3.85	4.19	4.66	4.72	4.32	3.52	3.63	3.86	4.94
R. E	55.69	65.57	71.36	79.36	80.38	73.57	59.95	61.82	65.74	84.13
* E	3.40	3.52	3.66	3.81	3.96	4.12	4.28	4.45	4.62	4.81
V=RE	57.90	59.95	62.33	64.88	67.44	70.16	72.89	75.78	78.68	81.91

*E: Values of E on the optimum slope. (4)

V. Conclusion and discussion

1) The company growth rate, $g = 3.47\%$

The results was ploted in Fig. 1.

2) *If* $i_c = 5\%$ $R = 17.03$

Since market value of the company, V = RE,

the all values of V according to E($/share) could be obtained.

V = 17.03E

The value of V during 10 years was tabulated on previous section and V was plotted on upper side of Fig.1

3) From 1964 to 1968, he income(E) and dividends was increased steadily.

From 1968 to 1970, E was decreased because of increase of dividends.

From 1970 to 1973, E was increased in spite of relatively high constant dividens.

Consequently, the company is able to be in a good future prospect comparatively.

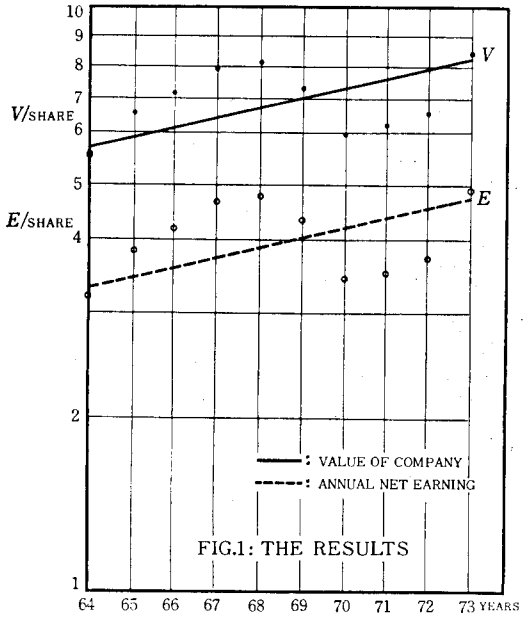

FIG.1: THE RESULTS

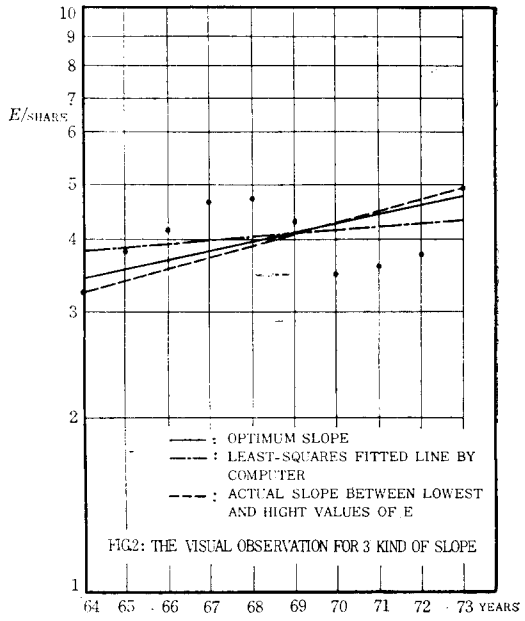

FIG2: THE VISUAL OBSERVATION FOR 3 KIND OF SLOPE

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TAURUS-28 MAR 74-PORT 50
LOGIN = PEBY516/E/MWT
JOB NAME PEBY516-134
  CHARGES YEAR-TO-DATE:TIME  $27.41 SUPPLIES  $16.09(CT16 ASSIGNED)
CC:
EXECPF, 4893, LSTSQ
GO:

INPUT X AND Y IN 2F10 FORMAT
NOTE: SET 〈BELL〉 TAB=11 〈CR〉 TO USE 〈TAB〉
      BE SURE TO INCLUDE THE DECIMAL POINTS TYPE〈BELL〉 EOP AFTER THE
      LAST DATA POINT

/    X    \/    Y    \

TAB = 11
0.              3.27
1.              3.85
2.              4.19
3.              4.66
4.              4.72
5.              4.32
6.              3.52
7.              3.63
8.              3.86
9.              4.94
EOF
INPUT ORDER OF EQUATION IN 12 FORMAT
[EXAMPLE: 2ND ORDER IS 02]
01
     RESULTS
   1 3.8647273
   2 0.0513939
          X                Y              Y CALC
    0.000000         3.270000         3.864727
    1.000000         3.850000         3.916121
    2.000000         4.190000         3.967525
    3.000000         4.660000         4.018909
    4.000000         4.720000         4.070303
    5.000000         4.320000         4.121697
    6.000000         3.520000         4.173091
    7.000000         3.630000         4.224485
    8.000000         3.860000         4.275879
    9.000000         4.940000         4.327273
```

STOP

CC:
LOGOUT

ACCOUNT-RUN	LN-MIN	LN:COST	TM-SEC	TM-COST
PEBY516-134	12	10.08	1.429	50.10

Nomenclature

E($ /share) = Annual net earnings(profit)
I($ /share) = Annual operation cash income after taxes(= Net earning+write offs)
Div($ /share) = Annual dividend per share
g = Annual growth rate of E
e = ave. (div/E)
or ave. Div/ave.E = dividend ratio
i = g/(1−e) = Average company rate of erturn
D_i = 1−ave.E/I = Average venture discount factor or deferment factor based on i.
M = Value of company discounted at i
A = Undiscounted value of company
V = Value of company discounted at i_c (cost of money rate) or Market value of company
$V = D_cA = D_c/D_iM = D_c/D_i/(1+i)/i \cdot E$
or $V = (1+i)/(iD_i+i_c(1+D_i)) \cdot E$
R = Price earning ratio, $R = V/E$

REFERENCES

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2) "Ten Year Review of Financial Data" Shell Oil company and Subsidiary Co mpanies, 1973.
3) Folkert Brons "Profitability Analysis for Petroleum Engineers" University of Texas at Austin, Jan. 16, 1976
4) Jame's W. Glanville "Rate of Return Calculations as a Measure of Investment Opportunities", Jour. Pet. Tech. June, 1957

*Fig. 3: The Computer sheet for Least-square