

— —

0

(2020)^[1]

" "

"

" (AIA180010)

1997

200234

100

1157250381@qq.com 19821833690

1981

200234

100

D

207

yunying0156@163.com 13764280809

2019 6

2019 [2]
(DCF) (EVA) (PE) (PB)

1

F(1906) Irving

[3] Sharpe(1964) CAPM ()

[4] CAPM Jensen(1986)

[5] (RIV) Ohlson(1995)

[6] R.M.Hand Joshua G.Coyne(2017) ROE John

Erb Edina Cziglerne 2020 DCF DCF [7]

[8]

2016

[9]

2019

EVA

[10] EVA

2007

[11]

2016

[12]

2017

[13]

2020

PFM

[14]

2017

[17]

(2019)

[18]

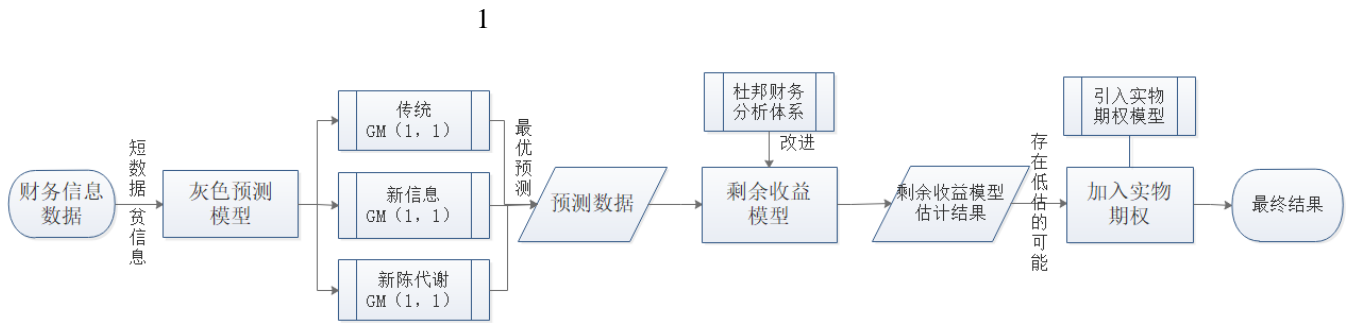
2019

ARIMA

ARIMA

[19]

(2019)^[20]



1982

[21]

GM(1,1)

$$\hat{x}^{(0)}(m+1) = \hat{x}^{(1)}(m+1) - \hat{x}^{(1)}(m) = (1 - e^{\hat{a}}) \left[x^{(0)}(1) - \frac{\hat{b}}{\hat{a}} \right] e^{-\hat{a}m}, m = 1, 2, \dots, n-1$$

1			GM(1,1)	GM(1,1)
2	$k_0 > 1$	$x^{(0)}(1), x^{(0)}(2), \dots, x^{(0)}(n)$		GM(1,1)
		GM(1,1);		
3	$x^{(0)}(n+1)$	$x^{(0)}(n+1)$	$x^{(0)}$	$x^{(0)} = (x^{(0)}(1), x^{(0)}(2), \dots,$
	$x^{(0)}(n)$		GM(1,1)	
4	$x^{(0)}(n+1)$	$x^{(0)}(1)$		$x^{(0)} = (x^{(0)}(2), x^{(0)}(3), \dots,$
	$x^{(0)}(n)$		GM(1,1)	
				GM(1,1)

Ohlson 1995

$$V_n = \sum_{t=1}^n \frac{RI_t}{(1+r)^t} + \frac{R_n E_n}{(1+r)^n} \tag{8}^{[14]}$$

(2020)^[16]

(9)^[15] :

$$ROE_t = MOS$$

(9)

$$, ATO_t \quad EM_t \quad MOS_t$$

P/E

P/B

市净率 (P/B) = 每股市价 (P) ÷ 每股净资产 (B)

(10)

$$V_n = BV_0 + \frac{\sum_{t=1}^n S_t \times M}{\quad} \quad (10)$$

(2015)^[17] ,

- B-S

$$C(V_t, t)$$

(11)

$$C(V_t, t) \quad V_t \quad X$$

$N(\bullet)$

σ

t

r_f

$$V = V_n + C(V_t, t) \quad (12)$$

(ATO) (EM) (S) (MOS)

2015 2019 2020 2024

wind

2019 2020 3 31

2015	2016	2017	2018	2019
1.17	1.50	1.23	2.19	1.51

1 2018 1.5

2018 18.28

1.52

(2018)^[22]

2016	2017	2018	2019
8.390	4.590	1.710	1.190
1.246	0.720	0.538	0.457
5.930	4.008	1.699	1.175
1.106	0.586	0.415	0.332
4.286	3.415	1.656	1.154

	2016	2017	2018	2019
	2.145	1.126	0.533	0.350
	1.250	0.573	0.365	0.268
	1.046	0.515	0.341	0.254
	7.750	2.914	0.818	0.558
	1.237	0.678	0.431	0.334
	1.075	0.552	0.369	0.284

3

Matlab 2016b

GM(1,1)

4 4

G(1,1)

GM(1,1)

GM(1,1)

GM(1,1)	GM(1,1)	GM(1,1)
4.19×10^{16}	4.891×10^{16}	5.155×10^{16}
29.45	29.43	29.41
4.33×10^{-3}	4.24×10^{-3}	4.21×10^{-3}

5

5

10%

10%

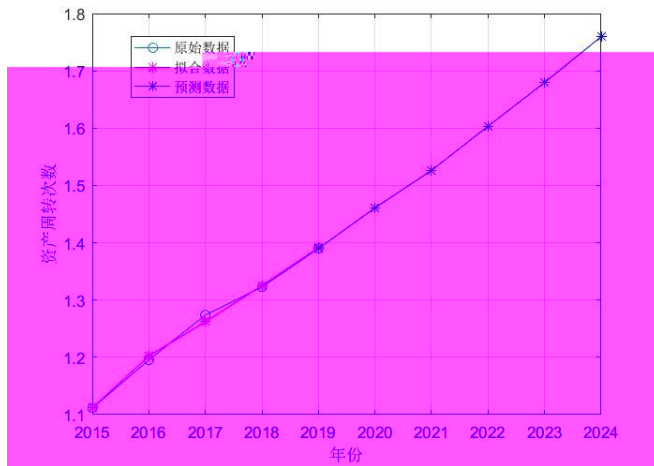
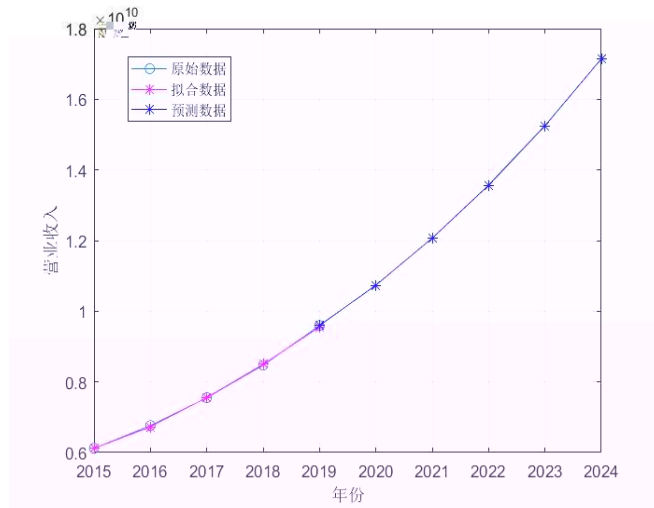
	2016	2017	2018	2019	
	0.005767	0.001099	0.003129	0.004599	0.0036486
	0.01684	0.00704	0.002162	0.007572	0.0084045

0.002103	0.002715	0.00086067	0.00143	0.0017635
0.04065	0.004807	0.001913	0.002238	0.012403

()

0.005624	0.009219	0.002001	0.0009293	0.0044432
0.02375	0.01475	0.01133	0.00106	0.012723

1 2



6

2020 2021 2022 2023 2024

	107.38	120.70	135.68	152.52	171.44
%	1.54	2.02	3.08	4.17	4.95
	1.46	1.53	1.60	1.68	1.76
	1.52				

1.61

r CAPM

$r = r_f + \beta(r_m - r_f)$

r_f

2019

4.27% $(r_m - r_f)$ 6% wind

$\beta = 0.80$ $r = 9.5\%$

2019

10.9966 0.44

24.99

	2020	2021	2022	2023	2024	
RI	-252132163	-226339806.3	-110185633.6	43055085.01	181128412.7	-364474105.2
	-230257683.1	-188769880.8	-83923312.2	29948010.34	115057778.7	-357945087.1

7

1.0703

2019

$BV_0 = 5202515000$

1.11884×10^{11}

2020 3 31

12072.82

9.2675

2020 3 31

10.9966

(11) V_t

$V_t = 9.267$ X
 σ 为 $(P_t - P_{t-1}) / P_{t-1}$
 $\sigma = 58.63\%$

$X = 10.9966$

5

$d_1 = 1.1303, d_2 = 0.309$

$C(V, t) = 2.5518$

11.8193

31

9.2675

2020 3

10.9966

1.7291

11.8193

0.8227

- [1] . [J].
,2020(19):84-85.
- [2] . [J].
,2019,33(06):96-108.
- [3] Irving F.The Nature of Capital and Income [M].The Macmillan Company,1906:267-268.
- [4] Sharpe W F. Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk[J], The Journal of Finance,1964,19(3):425-442.
- [5] Jensen M C. Agency Cost of Free Cash Flow[J].Corporate Finance And Economics Reviews, 1986,72(2):323-339.
- [6] OHLSON J A. Earnings,book values, and dividends in equity valuation [J].Contemporary Accounting Research, 1995,11(3):661-687.
- [7] John R.M.Hand,Joshua G.Coyne,Jeremiah R.Green,X.Frank Zhang.The Use of Residual Income Valuation Methods by U.S. Sell-Side Equity Analysts[J].Journal Of Financial Reporting,2017:1-29.
- [8] Erb, Edina Cziglerne. The Re-emergence of the Residual Income Model in the Valuation of Firms and Investment Projects [J]. Public Finance Quarterly,2020(3):430-442.
- [9] , . [J]. ,2016(19):26-31.
- [10] .EVA [J].
,2019,41(S2):49-51.
- [11] , , . DCF [J].
,2007(12):59-61.
- [12] , . [J]. ,2016(16):26-28.
- [13] , . [J].
,2017,36(04):118-135.

[14] , , . [J].
,2020(09):55-69.

[15] . [J]. ,2009(27):9-11.

[16] , . [J].
,2020(15):45-49.

[17] . [J]. ,2017(15):83-87.

[18] , . [J]. ,2019(05):98-103.

[19] , . ARIMA [J].
,2019,35(23):38-41.

[20] , . [J]. (,2019,47(04):104-110.

[21] . [M]. : ,1987.

[22] , . [J].
,2019,34(10):2213-22.

Research on the Construction and Application of the Value Evaluation Model of Scientific and Technological Enterprises Comprehensive framework based on grey forecasting, residual income and real option models

Abstract With the development of digital economy industries such as big data and artificial intelligence, the capital market will pay more and more attention to scientific and technological enterprises such as Internet healthcare and cloud computing. However, due to their high R&D investment, high risks, and low returns Stability and other development characteristics, traditional valuation methods are no longer applicable. Based on the characteristics of the science and innovation industry, this paper constructs a comprehensive value evaluation model that combines gray forecasting, residual income and real options, and uses the Internet medical company Ali Health as an example to conduct model evaluation and comparative analysis. From the estimation results, the valuation result of the residual income model is relatively close to the enterprise value, but there is a possibility of underestimation. After further considering the addition of real options, the accuracy of the final valuation results has been significantly improved, and to a certain extent the problem of underestimation of corporate value that may exist in the residual income model has been improved. It provides a certain reference for the selection of value evaluation methods for science and technology enterprises.

Keywords residual income model real option model; grey forecasting model; science and innovation enterprise; value evaluation