

普通股估值

红利贴现模型 (Dividend Discounted Model)

- 假设第 t 期分配股息为 D_t

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t}$$

其中 k 为贴现率 (discount rate) ,
也称为cost of equity, expected return on stock

固定增长模型 (Constant growth model)

- 假设红利成长率是一个常数 g

$$V_0 = \frac{D_1}{k - g} = \frac{D_0(1 + g)}{k - g}$$

- 假设 $k > g$

Discount Rate

- k从哪里估计？看看Buffett怎么说：

“In order to calculate intrinsic value, you take those cash flows that you expect to be generated and you discount them back to their present value – **in our case, at the long-term Treasury rate**. And that discount rate doesn't pay you as high a rate as it needs to. But you can use the resulting present value figure that you get by discounting your cash flows back at the long-term Treasury rate as a **common yardstick** just to have a standard of measurement across all businesses.”

30-year Treasury rate



30-year Treasury rate (after '08 crisis)



Discount Rate

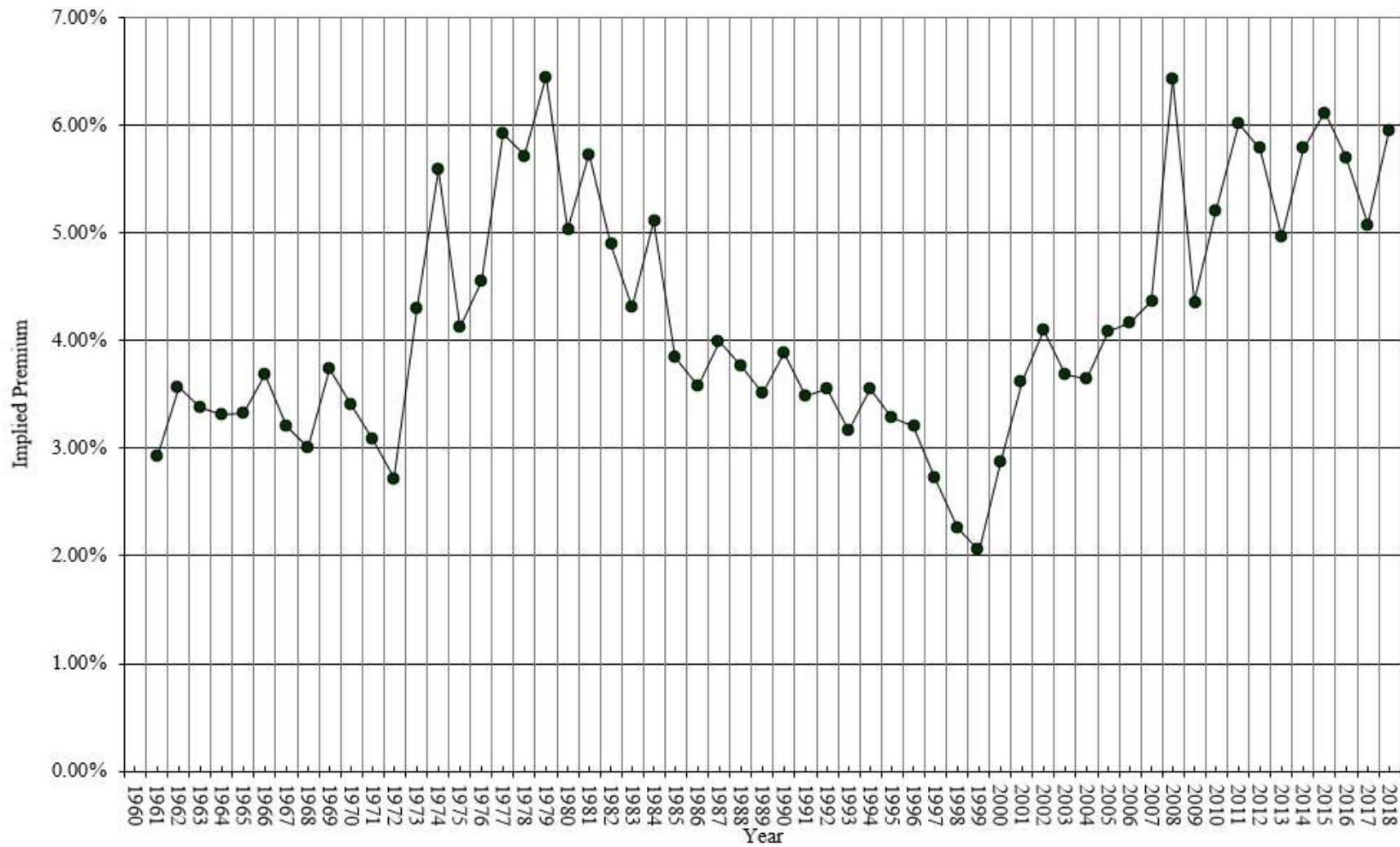
- Buffett再补充:

“We use **the same discount rate across all securities**. We may be more conservative in estimating cash in some situations. **Just because interest rates are at 1.5% doesn't mean we like an investment that yields 2-3%**. We have minimum thresholds in our mind that are a whole lot higher than government rates. When we're looking at a business, **we're looking at holding it forever, so we don't assume rates will always be this low.**”

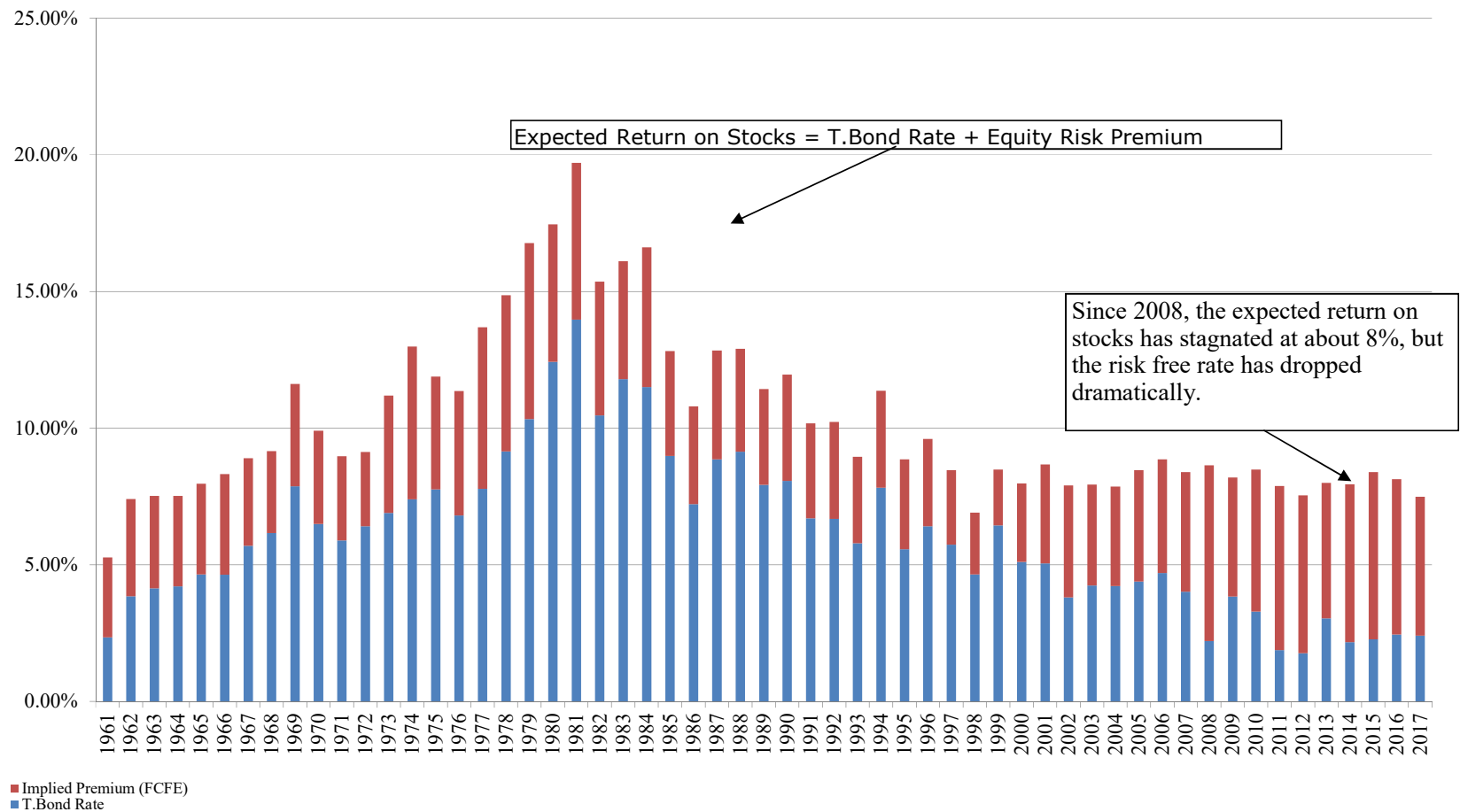
Discount Rate

- $\text{Discount Rate} = \text{Risk-Free rate} + \text{Risk Premium}$
- 更好的common yardstick应该为股市指数
 - 持有一家公司普通股的机会成本是股市指数
- 风险越高的股票，预期贴现率应该更高（高多少？）

Implied Premium for US Equity Market: 1960-2018



Implied ERP and Risk free Rates



Cost of equity by industry

- U.S. (<http://www.stern.nyu.edu/~adamodar/pc/datasets/wacc.xls>)

R.E.I.T.	6.7%
Insurance (General)	7.9%
Beverage (Soft)	9.7%
Beverage (Alcoholic)	10.4%
Semiconductor	10.6%
Entertainment	10.6%

- China (<http://www.stern.nyu.edu/~adamodar/pc/datasets/waccChina.xls>)

R.E.I.T.	9.6%
Insurance (General)	15.2%
Beverage (Soft)	11.0%
Beverage (Alcoholic)	14.7%
Semiconductor	14.8%
Entertainment	14.9%

固定增长模型的另外一种应用

- 不做普通股估值，而推估预期收益率

$$P_0 = \frac{D_0(1 + g)}{K - g} = \frac{D_1}{K - g}$$

$$k = \frac{D_0(1 + g)}{P_0} + g = \frac{D_1}{P_0} + g$$

- $k >$ 要求收益率(required rate of return) \rightarrow 投资

Dividend growth

$$g = ROE \times b$$

b : retention rate (reinvestment rate, 再投资率)

ROE : return on equity (股权收益率)

假设再投资率与股权收益率为固定

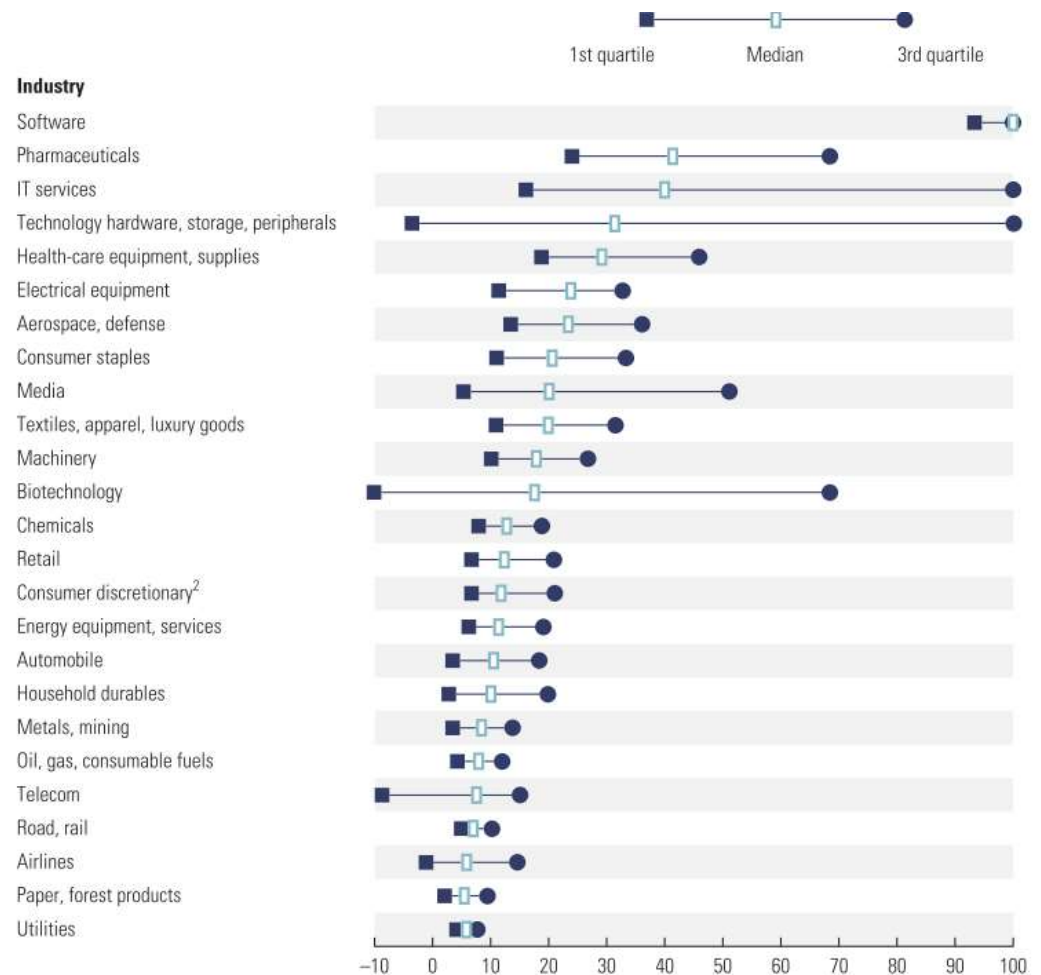
Dividend growth

$$g = ROE \times b$$

股权	ROE	NI	b*NI(再投资金额)	(1-b)*NI (红利)	g
100.0	0.15	15.00	10.00	5.00	
110.0	0.15	16.50	11.00	5.50	10%
121.0	0.15	18.15	12.10	6.05	10%
133.1	0.15	19.97	13.31	6.66	10%
146.4	0.15	21.96	14.64	7.32	10%

Constant growth model

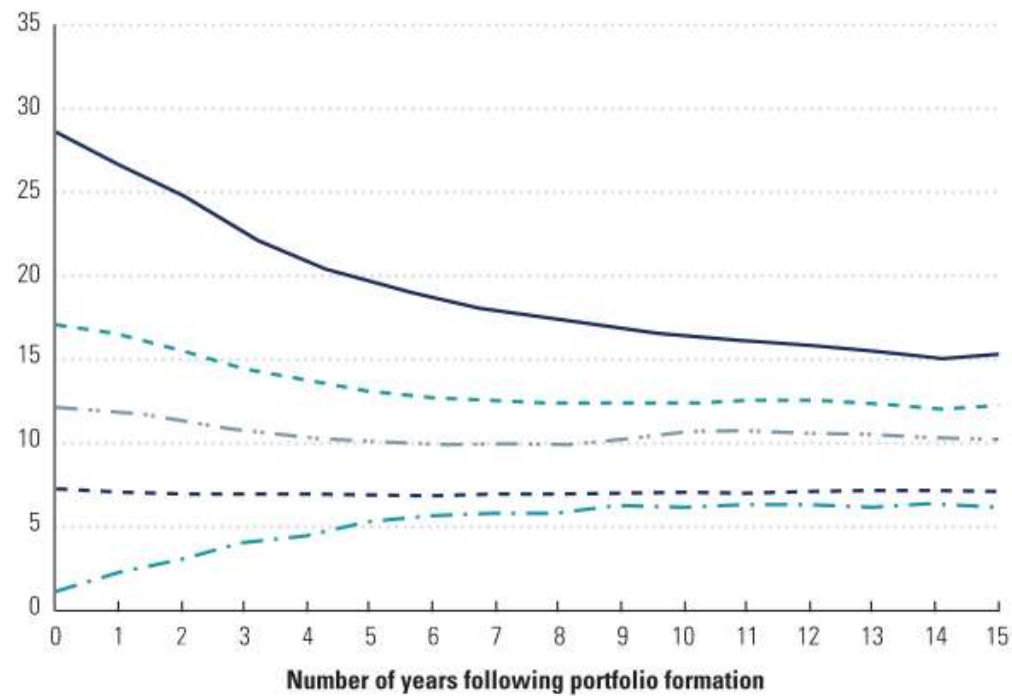
- 决定增长率的关键因素是获利能力
- 不同行业拥有不同的获利率



Constant growth model

- 只有少数公司可以维持固定的获利能力

Median ROIC of portfolios (without goodwill),¹ by quintile, %



两阶段增长模型

$$V_0 = \sum_{t=1}^n \frac{D_0(1+g_1)^t}{(1+k)^t} + \frac{1}{(1+k)^n} \frac{D_{n+1}}{k-g_2}$$

$$V_0 = \left(1 - \left(\frac{1+g_1}{1+k}\right)^n\right) \frac{D_0(1+g_1)}{k-g_1} + \frac{1}{(1+k)^n} \frac{D_{n+1}}{k-g_2}$$

- 假设第n期过后，红利是以 g_2 速度增长
- 优点：更符合真实现象
- 缺点：多了更多参数要推估 n, g_1, g_2

市盈率模型

- 股价 = 无增长的每股价值 + 增长机会的贴现值

$$P_0 = \frac{E_1}{k} + \text{PVGO}$$

- 无增长机会 $\rightarrow b=0$

$$P_0 = \frac{E_1(1 - b)}{k - (ROE * b)} = \frac{E_1}{k}$$

市盈率模型

- 增长机会 \neq 增长
 - 当 b 与 ROE 大于零, $g=ROE*b > 0$
 - 只有 $ROE > k$, $PVGO > 0$
- 若 $ROE=k$, $PVGO=0$, 股价也等于股票账面价值。
- 什么时候扩大投资对投资人有利?

市盈率比较

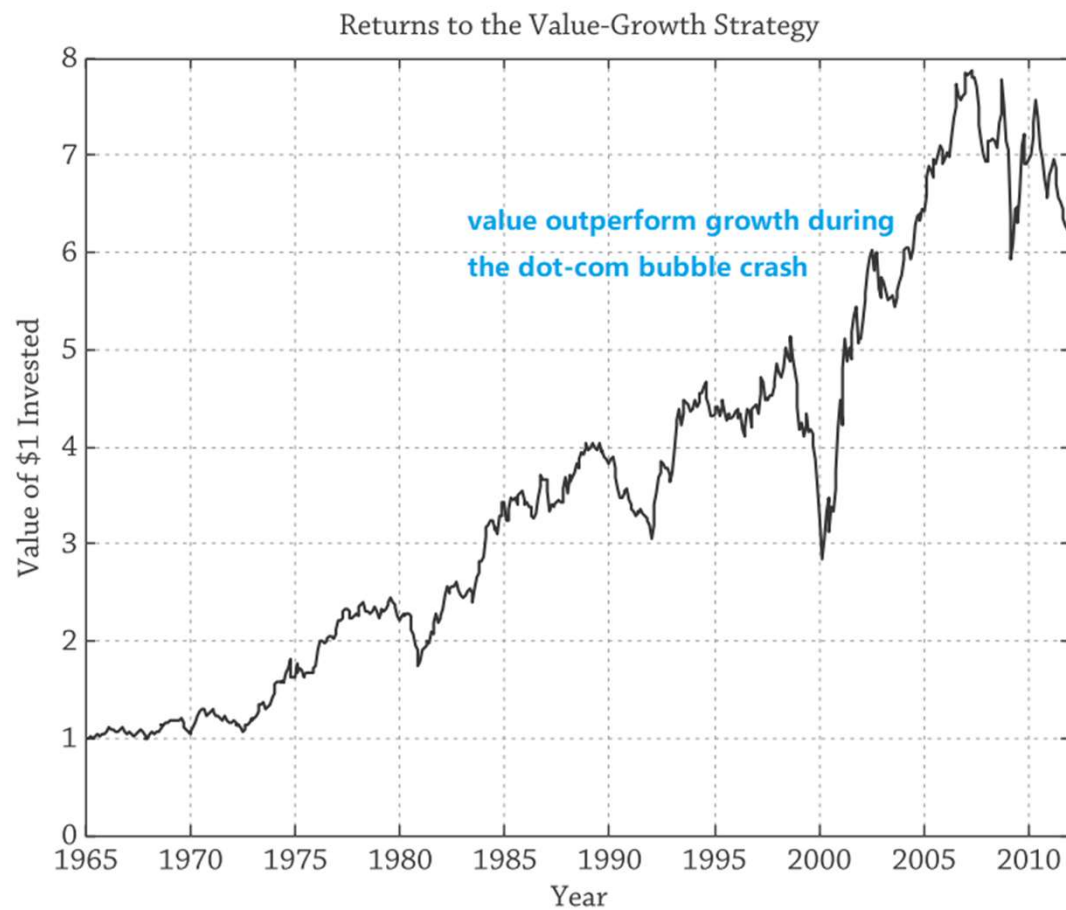
- 其他因素相同之下，市盈率越高隐含了增长机会越大

$$P_0 = \frac{E_1}{k} + PVGO$$

$$\frac{P_0}{E_1} = \frac{1}{k} \left[1 + \frac{PVGO}{E_1/k} \right]$$

- 正常的市盈率值应该为多少？

投资人对增长机会过度乐观？



长期平均而言，低市盈率策略
收益率高于高市盈率策略

Discounted free cash flow model (DCF)

- 红利贴现模型几个缺点：
 - 有些公司不发放红利
 - Dividend is irrelevant, 只要可以产生现金流量就可以, 不管有没有发放。
 - ROE会被财务杠杆扭曲, $ROE = \text{leverage} * ROA$
- 自由净现金流贴现模型:

$$V_0 = \frac{FCF_1}{k - g}$$

Discounted free cash flow model (DCF)

- 自由净现金流贴现模型:

$$V_0 = \frac{FCF_1}{k - g}$$

- 注意: k是对整个资产的要求报酬率, g是净现金流的增长率
- k应为WACC(weighted average cost of capital):

Debt/Asset \times cost of debt + Equity/Asset \times cost of equity