

Given: (a) FCF of each year t (between 2010 and 2013, both inclusive) grows at 17.5% (g_f) yearly; (b) estimated values of FCF of 2007-2009; (c) perpetual growth rate is 3%.

Based on our background info:

1. S&P grew approximately:
 1. 483% from Jan 1, 1988 to Jan 1, 2008, which is 9.21% annual growth
 2. 1451% from Jan 1, 1978 to Jan 1, 2008, which is 9.568% annual growth
2. CPI grew from 113.6 in Dec 1987 to 207.342 in Dec 2007, which is 3.05% annual growth

We make the following assumptions:

1. For perpetuity:
 1. the average market will grow at a rate equal to that of the S&P in the past 20 years: 9.21% per year
 2. the average annual CPI growth will be equal to that in the past 20 years: 3.05% per year
2. Visa's UL Beta (1.2) is chosen to be slightly below MasterCard's (1.27) because MC is...
 1. a smaller company (smaller companies are more volatile and risky and hence have higher UL betas)
 2. a direct competitor to Visa, so Visa should be close to MC.

Cash flow of year t (year t dollars—this value is unadjusted for inflation) unadjusted for the discount rate is

$$FCF_t = FCF_{2009}(1 + g_f)^{t-2009} \text{ for 2010-2013 and } FCF_t = FCF_{2013}(1 + g_p)^{t-2013} \text{ for 2014 and beyond}$$

If inflation is I (0.0305/year), the value of the FCF of year t in 2007 dollars is $FCF(t)/(1+I)^{(t-2007)}$. Let that be the adjusted

future cash flow value:
$$AFCF_t = \frac{FCF_t}{(1 + I)^{t-2007}}$$

So the total FCF in 2007 dollars for eternity is the sum of the following:

1. ACFF of 2007-2013:
$$AFCF_{2007-2013} = \sum_{t=2007}^{2013} \left(\frac{AFCF_t}{(1+r)^{t-2007}} \right)$$

2. Perpetual ACFF growing at 3% a year, each divided by the cumulative discount rate for that year (the newlines mean equivalence):

$$\begin{aligned} & \frac{AFCF_{2014-\infty}(\text{2007 dollars})}{(1+r)^{2014-2007}} + \dots + \frac{AFCF_t}{(1+r)^{t-2007}} + \dots \\ & \frac{FCF_{2013}(1+g_p)^{2014-2013}}{((1+r)(1+I))^{2014-2007}} + \dots + \frac{FCF_{2013}(1+g_p)^{t-2013}}{((1+r)(1+I))^{t-2007}} + \dots \\ & \sum_{t=2014}^{\infty} \left(\frac{FCF_{2013}(1+g_p)^{t-2013}}{((1+r)(1+I))^{t-2007}} \right) \\ & \frac{FCF_{2013}}{((1+r)(1+I))^6} \sum_{t=2014}^{\infty} \left(\frac{1+g_p}{1+I+rI+r} \right)^{t-2013} \\ & \frac{AFCF_{2013}(1+g_p)}{(1+r)^6(I+rI+r-g_p)} \end{aligned}$$

Therefore, the total is just the sum of the two:

$$Total\ ACFF = ACFF_{2007-2013} + ACFF_{2014-\infty} = \left(\sum_{t=2007}^{2013} \frac{AFCF_t}{(1+r)^{t-2007}} \right) + \frac{AFCF_{2013}(1+g_p)}{(1+r)^6(I+rI+r-g_p)}$$