Terminal Values For Firms With No Competitive Advantage

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Abstract

Two-phase valuation models are often used for the value of the firm, the value of the equity, the value added by the firm, and the value added by the equity. The first phase, called the explicit forecast period, employs explicit near-term forecasts and permits a variety of different types of performance over time. The second phase, called the continuing value period, is all of the time periods after the first phase and is treated as a steady state with constant long-term relationships. Terminal value models are used to represent the value generated during the second phase, the continuing value. This research introduces fundamental models representing structural relationships within the firm into the terminal value models utilized for the second phase in these valuation models. The resulting models for terminal value incorporating fundamental structural relationships are used to analyze the significance of the growth rate during the continuing value period and the proper ways to estimate the various terminal values.

"Many financial analysts routinely assume that the incremental return on capital during the continuing value period will equal the cost of capital. This practice relieves them of having to forecast a growth rate, since growth in this case neither adds nor destroys value (e.g., Koller, Goedhart, and Wessels, 2005)." The contribution of this paper is therefore not the "discovery" of this outcome, but providing the "proof" via the derivations and results shown that this outcome holds for various terminal value scenarios focusing on the free cash flow to the firm, the free cash flow to the equity, the economic profit to the firm, and the economic profit to the equity. The significant outcome is that concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant during the continuing value period when the incremental return on capital equals the cost of capital.

JEL Codes: G12, G31

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1. Introduction

Value-based management systems focus on wealth and the wealth creation process and promote the generation of value for the shareholders (e.g., Ehrbar, 1998; Fisher, 1995; Lieber, 1996; Rappaport, 1998; Walbert, 1994). The value of the firm is equal to the present value of its expected future cash flows over its infinite life. Since it is not possible to explicitly estimate all of the expected future cash flows for a business firm, explicit expected future cash flows are forecasted for a period of time usually called the explicit forecast period, sometimes called the competitive advantage/disadvanatge period (e.g., Mauboussin and Johnson, 1997a and 1997b), and then the value of the firm at the end of this period is estimated using a terminal value model. The terminal value is usually estimated using a discounted cash flow model with a constant perpetual growth rate and constant cost of capital (e.g., Koller, Goedhart, and Wessels, 2005; Damodaran, 2002; Fernandez, 2002; Stewart, 1991). Typically a large portion of the value of any firm comes from its terminal value. Terminal value has often been the source of much of the criticism of the discounted cash flow approach to valuation. Critics argue that terminal value is easy to manipulate to produce any number desired. It is argued that the higher the long-term sustainable growth, the higher the terminal value. The terminal value is thought to capture the value associated with growth. Often there is considerable uncertainty and debate with respect to the appropriate rate for long-term sustainable growth which centers on discussions of constraints on growth imposed by the economic system, industry, or market (e.g., Koller, Goedhart, and Wessels, 2005; Damodaran, 2002; Fernandez, 2002).

In this paper, two-phase valuation models are used for the value of the firm, value of the equity, value added by the firm, and value added by the equity. The first phase in these models, phase one, is a period during which an explicit forecast is employed and varying behavior is typical. This phase can be interpreted as being a competitive advantage/disadvantage period (e.g., Mauboussin and Johnson, 1997a and 1997b) during which non-zero excess returns can occur. The second phase in the valuation model, phase two, is the remaining time periods. This phase is often referred to as the continuing value period. During the continuing value period, parameters have constant steady-state values and relationships. The value or value added associated with the continuing value period is incorporated in the terminal value at the beginning of phase two, the end of phase one. During the continuing value period, after the competitive advantage/disadvantage period, competitive adjustments have driven excess returns to zero (e.g., Mauboussin and Johnson, 1997a and 1997b). Fundamental models representing structural relationships within the firm are introduced in the terminal value models used in the two-phase valuations for the value of the firm, value of the equity, value added by the firm, and value added by the equity. The resulting fundamental models for the respective terminal value models are used to analyze the significance of the constant growth rate during the continuing value period and the proper ways to estimate the various terminal values.

2. Valuation models

Measures of future cash flows, CF_t, and the cost of capital, r, are used by generally accepted valuation frameworks to provide measures of the value of the firm or the equity of the firm (e.g., Koller, Goedhart, and Wessels, 2005; Damodaran, 2002; Fernandez, 2002). The magnitude, timing, and riskiness of future cash flows and the cost of capital determine the value of the firm

or the equity and the market value of investors' funds. A two-phase valuation model for cash flow has the form

$$V_0 = \sum_{t=1}^{T} \frac{CF_t}{(1+r)^t} + \frac{V_T}{(1-r)^T} \tag{1}$$

$$V_T = \sum_{t=T+1}^{n} \frac{CF_T \cdot (1+g)^{t-T}}{(1+r)^{t-T}} = CF_T \cdot \sum_{t=T+1}^{n} \left(\frac{1+g}{1+r}\right)^{t-T} \quad \text{as } n \to \infty \tag{2}$$

$$V_T = \frac{CF_T \cdot (1+g)}{r-g} = \frac{CF_{T+1}}{r-g} \tag{3}$$

when constant growth with g less than r occurs after time T. The first T periods in this model, phase one, represent an explicit forecast (transition) period, sometimes also called a competitive advantage/disadvantage period, during which varying behavior is possible and the remaining time periods, (phase two) are a steady-state continuing value period during which growth is constant and parameters have steady-state values (Koller, Goedhart, and Wessels, 2005; Fabozzi and Grant, 1999; Fabozzi and Grant, 2002; Stewart, 1991).

The measure of cash flow for the firm at time t is free cash flow to the firm, $FCFF_t$, and the measure of cash flow for the equity of the firm at time t is free cash flow to the equity, $FCFE_t$ (e.g., Damodaran, 2002; Fernandez, 2002). $FCFF_t$ is defined as being equal to the net operating profit after taxes, $NOPAT_t$, less the required net investment for the firm, $NINVF_t$. The model for free cash flow to the firm at time t is

$$FCFF_t = NOPAT_t - NINVF_t \tag{4}$$

Net operating profit after taxes at time t is equal to earnings before interest and taxes, $EBIT_t$, after taxes. In this model, τ is the cash income tax rate.

$$NOPAT_t = (1-\tau) \cdot EBIT_t . \tag{5}$$

Net investment for the firm at time t is equal to the change in the book value of capital (also called invested capital), ΔBVC_t.

$$NINVF_t = \Delta BVC_t = BVC_t - BVC_{t-1} \tag{6}$$

The book value of capital at time t is equal to the total amount of investor-supplied funds:

$$BVC_t = BVD_t + BVPS_t + BVE_t \tag{7}$$

where BVD_t is the book value of interest-bearing debt at time t, $BVPS_t$ is the book value of preferred stock at time t, and BVE_t is book value of common equity at time t.

$FCFE_t$ is defined as being equal to the net income, NI_t, less the required net investment of equity, $NINVE_t$. The model for free cash flow to the equity at time t is

$$FCFE_t = NI_t - NINVE_t . \tag{8}$$

Net investment of equity at time t is equal to the change in the book value of common equity, ΔBVE_t.

$$NINVE_t = \Delta BVE_t = BVE_t - BVE_{t-1} . \tag{9}$$

3. Fundamental model for the terminal value of the firm

In this type of valuation model, the model for the terminal value of the firm at time T is

$$VF_T = \frac{FCFF_T \cdot (1+g)}{r_c - g} = \frac{FCFF_{T+1}}{r_c - g} = \frac{NOPAT_{T+1,} - NINVF_{T+1}}{r_c - g} \tag{10}$$

where r_c is the weighted average cost. The reinvestment rate for the firm for the steady state is

$$rr = \frac{NINVF_{T+1}}{NOPAT_{T+1}} = \frac{\Delta BVC_{T+1}}{NOPAT_{T+1}} \tag{11}$$

which suggests models for the net investment for the firm,

$$NINVF_{T+1} = \Delta BVC_{T+1} = rr \cdot NOPAT_{T+1} \tag{12}$$

and free cash flow to the firm,

$$FCFF_{T+1} = NOPAT_{T+1} - rr \cdot NOPAT_{T+1} = (1 - rr) \cdot NOPAT_{T+1} \tag{13}$$

The rate of return on capital for the firm for the steady state is

$$ROC = \frac{NOPAT_{T+1}}{BVC_T} . \tag{14}$$

The models for net operating profit after taxes and the free cash flow to the firm at time T in terms of the rate of return on capital and the book value of capital are

$$NOPAT_{T+1} = ROC \cdot BVC_T \tag{15}$$

and

$$FCFF_{T+1} = (1 - rr) \cdot NOPAT_{T+1} = (1 - rr) \cdot ROC \cdot BVC_T . \tag{16}$$

The constant growth rate for the free cash flow to the firm for the steady-state period is

$$g = rr \cdot ROC. \tag{17}$$

Using these models for net operating profit after taxes and the free cash flow to the firm at time T and the steady-state model for growth shows that

$$VF_T = \frac{FCFF_{T+1}}{r_c - g} = \frac{(1-rr)\cdot ROC \cdot BVC_T}{r_c - rr \cdot ROC}. \tag{18}$$

In the steady-state period after the competitive advantage/disadvantage period when constant growth occurs in this valuation model, competitive adjustments have eliminated excess returns which means that

$$ROC = r_c. \tag{19}$$

Substituting this result of competitive pressures into the model for the terminal value of the firm shows that

$$VF_T = \frac{(1-rr)\cdot ROC \cdot BVC_T}{r_c - rr \cdot ROC} = \frac{(1-rr)\cdot r_c \cdot BVC_T}{(1-rr)\cdot r_c} = BVC_T. \tag{20}$$

This is a significant result because it shows that concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant as long as g is less than r_c and competition makes ROC approximately equal to r_c. The two-phase valuation model for the firm is

$$VF_0 = \sum_{t=1}^{T} \frac{FCFF_t}{(1+r_c)^t} + \frac{BVC_T}{(1-r_c)^T} \tag{21}$$

and the terminal value of the firm should be estimated by using the book value of the capital at the end of the competitive advantage/disadvantage period, time T. This result shows that when valuing the firm, it is not necessary to estimate the constant growth rate for the continuing value period if the first phase is long enough to include the entire competitive advantage/disadvantage period.

4. Fundamental model for the terminal value of the equity

The model for the terminal value of the equity of the firm at time T is

$$VE_T = \frac{FCFE_T \cdot (1+g)}{r_e - g} = \frac{FCFE_{T+1}}{r_e - g} = \frac{NI_{T+1} - NINVE_{T+1}}{r_e - g} \tag{22}$$

where r_e is the cost of equity capital. The equity reinvestment rate for the steady state is

$$\text{err} = \frac{\text{NINVE}_{T+1}}{\text{NI}_{T+1}} = \frac{\Delta\text{BVE}_{T+1}}{\text{NI}_{T+1}}. \tag{23}$$

This relationship suggests models for the net investment for the equity,

$$\text{NINVE}_{T+1} = \Delta\text{BVE}_{T+1} = \text{err} \cdot \text{NI}_{T+1}, \tag{24}$$

and free cash flow to the equity,

$$\text{FCFE}_{T+1} = \text{NI}_{T+1} - \text{err} \cdot \text{NI}_{T+1} = (1 - \text{err}) \cdot \text{NI}_{T+1}. \tag{25}$$

The rate of return on equity for the firm for the steady state is

$$\text{ROE} = \frac{\text{NI}_{T+1}}{\text{BVE}_T}. \tag{26}$$

Net income at time T in terms of the rate of return on equity and the book value of equity is

$$\text{NI}_{T+1} = \text{ROE} \cdot \text{BVE}_T \tag{27}$$

and the free cash flow to equity at time T in terms of the rate of return on equity and the book value of equity is

$$\text{FCFE}_{T+1} = (1 - \text{err}) \cdot \text{NI}_{T+1} = (1 - \text{err}) \cdot \text{ROE} \cdot \text{BVE}_T. \tag{28}$$

The steady-state constant growth rate for the free cash flow to equity for the continuing value period is

$$g = \text{err} \cdot \text{ROE}. \tag{29}$$

The terminal value of the equity at time T in terms of the equity reinvestment rate, the return on equity, and the book value of equity is

$$\text{VE}_T = \frac{\text{FCFE}_{T+1}}{r_e - g} = \frac{(1 - \text{err}) \cdot \text{ROE} \cdot \text{BVE}_T}{r_e - \text{rr} \cdot \text{ROE}}. \tag{30}$$

When constant growth occurs in this valuation model during the steady-state period after the competitive advantage/disadvantage period when competition has eliminated excess returns,

$$\text{ROE} = r_e. \tag{31}$$

Competitive pressures cause the terminal value of the firm to be equal to

$$VE_T = \frac{(1-err)\cdot ROE\cdot BVE_T}{r_e - err\cdot ROE} = \frac{(1-err)\cdot r_e\cdot BVE_T}{(1-err)\cdot r_e} = BVE_T. \quad (32)$$

This is also a significant result because it shows again that concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant as long as g is less than r_e and competition makes ROE approximately equal to r_e. The two-phase valuation model for the equity is

$$VE_0 = \sum_{t=1}^{T}\frac{FCFE_t}{(1+r_e)^t} + \frac{BVE_T}{(1-r_e)^T} \quad (33)$$

The terminal value of the equity should be estimated by using the book value of the equity at the end of the competitive advantage period, time T. When valuing the equity of the firm, it is not necessary to estimate the constant growth rate for the continuing value period when the first phase includes the entire competitive advantage/disadvantage period.

5. Fundamental model for the terminal value of the firm using economic profit

Economic profit to the firm at time t, EPF_t, is equal to the net operating profit after taxes less the charge for the required beginning book value of capital, CCF_t. Economic profit to the firm is also named economic value added (EVA) (e.g., Koller, Goedhart, and Wessels, 2005; Grant, 2002; Marshal, 1997; Stern, Stewart, and Chew, 1995; Stewart, 1991). The model for economic profit to the firm is

$$EPF_t = NOPAT_t - CCF_t. \quad (34)$$

The charge for required beginning book value of capital is equal to the weighted average cost of capital times the required beginning book value of capital.

$$CCF_t = r_c\cdot BVC_{t-1}. \quad (35)$$

Applying the two-phase valuation model to economic profit gives a model for value added by the firm:

$$VAF_0 = \sum_{t=1}^{T}\frac{EPF_t}{(1+r_c)^t} + \frac{VAF_T}{(1-r_c)^T} \quad (36)$$

$$VAF_T = \sum_{t=T+1}^{n}\frac{EPF_T\cdot(1+g)^{t-T}}{(1+r_c)^{t-T}} = EPF_T\cdot\sum_{t=T+1}^{n}\left(\frac{1+g}{1+r_c}\right)^{t-T} \quad \text{as } n\to\infty \quad (37)$$

$$VAF_T = \frac{EPF_T\cdot(1+g)}{r_c-g} = \frac{EPF_{T+1}}{r_c-g} \quad (38)$$

when g is less than r_c and constant growth occurs after time T. Using the model for net operating profit after taxes at time T in terms of the rate of return on capital and the book value of capital shows that

$$EPF_{T+1} = NOPAT_{T+1} - CCF_{T+1} = ROC \cdot BVC_T - r_c \cdot BVC_T = (ROC - r_c) \cdot BVC_T . \quad (39)$$

In the steady-state period after the competitive advantage/disadvanatage period when constant growth occurs in this valuation model, competition has eliminated excess returns which means that

$$ROC = r_c . \quad (40)$$

Substituting this result of competitive pressures into the model for the terminal value of the firm shows that

$$VAF_T = \frac{(ROC - r_c) \cdot BVC_T}{r_c - g} = 0. \quad (41)$$

This is a significant result because it shows that concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant as long as g less than r_c and competition makes ROC is approximately equal to r_c. The valuation model for the value added by the firm is

$$VAF_0 = \sum_{t=1}^{T} \frac{EPF_t}{(1 + r_c)^t} \quad (42)$$

and the terminal value of the value added by the firm at time T should be estimated as zero. These results reinforce the idea that it is not necessary to estimate the constant growth rate for the continuing value period when estimating the terminal value for the value added by the firm.

6. Fundamental model for the terminal value of the equity using economic profit

Economic profit to the equity at time t, EPE_t, is equal to the net income less the charge for the required beginning book value of capital CCE_t. The model for economic profit to the equity is

$$EPE_t = NI_t - CCE_t . \quad (43)$$

The charge for required beginning book value of equity is equal to the cost of equity capital times the required beginning book value of equity (e.g., Fernandez, 2002).

$$CCE_t = r_e \cdot BVE_{t-1} . \quad (44)$$

Applying the two-phase valuation model to economic profit to equity gives a model for value added by the equity of the firm that is

$$VAE_0 = \sum_{t=1}^{T} \frac{EPE_t}{(1+r_e)^t} + \frac{VAE_T}{(1-r_e)^T} \tag{45}$$

$$VAE_T = \sum_{t=T+1}^{n} \frac{EPE_T \cdot (1+g)^{t-T}}{(1+r_e)^{t-T}} = EPE_T \cdot \sum_{t=T+1}^{n} \left(\frac{1+g}{1+r_e} \right)^{t-T} \quad \text{as } n \to \infty \tag{46}$$

$$VAE_T = \frac{EPE_T \cdot (1+g)}{r_e - g} = \frac{EPE_{T+1}}{r_e - g} \tag{47}$$

when g is less than r_e and constant growth occurs after time T. Using the model for net income at time T in terms of the rate of return on equity and the book value of equity shows that

$$EPE_{T+1} = NI_{T+1} - CCE_{T+1} = ROE \cdot BVE_T - r_e \cdot BVE_T = (ROE - r_e) \cdot BVE_T. \tag{48}$$

In the steady-state period after the competitive advantage/disadvantage period when constant growth occurs in this valuation model, competition has eliminated excess returns which means that

$$ROE = r_e. \tag{49}$$

Substituting this result of competitive pressures into the model for the terminal value of the equity shows that

$$VAE_T = \frac{(ROE - r_e) \cdot BVE_T}{r_e - g} = 0. \tag{50}$$

This is a significant result because it shows that as long as g less than r_e and competition makes ROE is approximately equal to r_e concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant. The valuation model for the value added by the equity is

$$VAE_0 = \sum_{t=1}^{T} \frac{EPE_t}{(1+r_e)^t} \tag{51}$$

and the terminal value of the value added by the equity at time T should be estimated as zero. These results show that it is not necessary to estimate the constant growth rate for the continuing value period when estimating the terminal value for the value added by the equity.

7. Summary and conclusions

This research shows that concerns about whether the steady-state growth rate is greater than, less than, or equal to the growth rate for the economy are unimportant in competitive markets. The terminal value of the firm should be estimated as being equal to the book value of capital (also called invested capital) at the end of the competitive advantage/disadvantage period and the terminal value of the value added by the firm should be estimated as being equal to zero. In competitive markets, the valuation model for the value of the firm is

$$VF_0 = \sum_{t=1}^{T} \frac{FCFF_t}{(1+r_c)^t} + \frac{BVC_T}{(1-r_c)^T}, \tag{52}$$

the valuation model for the value added by the firm is

$$VAF_0 = \sum_{t=1}^{T} \frac{EPF_t}{(1+r_c)^t}, \tag{53}$$

and

$$VAF_0 + BVC_0 = VF_0. \tag{54}$$

The terminal value of the equity should be estimated as being equal to the book value of capital (also called invested equity capital) at the end of the competitive advantage/disadvantage period and the terminal value of the value added by the equity should be estimated as being equal to zero. In competitive markets, the valuation model for the value of the equity is

$$VE_0 = \sum_{t=1}^{T} \frac{FCFE_t}{(1+r_e)^t} + \frac{BVE_T}{(1-r_e)^T}, \tag{55}$$

the valuation model for the value added by the equity is

$$VAE_0 = \sum_{t=1}^{T} \frac{EPE_t}{(1+r_e)^t}, \tag{56}$$

and

$$VAE_0 + BVE_0 = VE_0. \tag{57}$$

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