

**CORPORATE VALUATION TECHNIQUES AND CASE  
STUDY IN VALUING A KOREAN COMPANY**

by

**ZHANG, Lijuan**

**THESIS**

**Submitted to**

**KDI School of Public Policy and Management  
in partial fulfillment of the requirements  
for the degree of**

**MASTER OF BUSINESS ADMINISTRATION**

**2007**

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**Approval as of Oct30, 2007**

**Supervisor David J. Behling**\_\_\_\_\_**David J Behling**\_\_\_\_\_



## **Abstract**

The objective of this paper is to use the valuation techniques to value selected Korean company. The paper introduces the three basic Valuation Techniques and illustrates how to value the true value of companies by using free cash flow to the firm approach.

The three basic valuation techniques includes: fundamental analysis, technical analysis, and modern portfolio theory (MPT). The most popular methods in fundamental analysis are: *Target stock price analysis, relative value analysis and discounted cash flow analysis*. The discounted cash flow analysis includes three models: the dividend discount model (DDM), the free cash flow to equity model (FCFE) and the free cash flow to the firm model (FCFF). The author introduces the FCFF model in detail and uses it in the case study, because the author believes that from a stock valuation standpoint, stockholders should be more concerned about the free cash flow to the firm rather than the profits, since on any corporate investment, a corporation creates additional value for stockholders if and only if it earns a rate of return, after all net cash flow adjustments, that exceeds the corporation's weighted average cost of capital. This occurs only when the investment generates additional free cash flow to the firm.

The second main objective is to provide a financial analysis of the selected company-- SK Telecom. In this part, the paper addresses two questions: how the industry trends affect the mobile company and what are the implications of those trends on the financial performance and fundamental value of the selected company.

Throughout the analysis, the position of the selected company is analysed in depth to understand how it has responded to the increased competition in the global mobile industry. In recent years, the industry is approach saturation in the developed countries and the market competition becomes very fierce.

The final part of this paper uses an appropriate valuation model—ValuePro2002 to get the intrinsic value of this company and give recommendation. According to the ValuePro2002 program, the intrinsic value of SK Telecom is far above the market price, so I recommend a strong buy.

## **Acknowledgements**

First of all, I would like to thank the Korean Development Institute School of Public Policy and Management for giving me the opportunity to attend the Master in Business Administration program and all my professors in our school.

I am very much thankful to Professor David Behling for giving me so much knowledge, courage, advices, and help in this project and during the past 2 years.

Finally, I specially thank my family for their encouragement and patience during this project.

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## **Introduction**

A valuation is the determination of the worth of a business. This is a complicated process which includes both art and science aspects. Generally, stock market valuation can be classified into one of three groups-fundamental analysis, technical analysis, and modern portfolio theory (MPT). The three philosophies have different beliefs about the relationship between the stock price and underlying intrinsic stock values. Technical analysts believe that there is no necessary relationship between a stock's price and its underlying intrinsic value. Short-term stock price movements are influenced primarily by changes in market psychology and reflect the greed versus fear mentality of investors. On the other side, Modern portfolio theory believe that stock prices always reflect underlying intrinsic values due to the competitive forces in the stock market. Under this theory, the market is efficient because new information is very quickly incorporated into stock prices and there never are any undervalued or overvalued stocks. Fundamental analysis believes that a stock has a true or intrinsic value to which its price is anchored. Price may diverge from this value in the short run, but in the long term, price and intrinsic value will converge. In this analysis, value is a function of revenue, growth, earnings, dividends, cash flows, profit margins, risk, interest rates and other factors. Target Stock Price Analysis, Relative Value Analysis and Discounted Cash Flow Analysis are the most popular methods in fundamental analysis.

Stock valuation is extremely useful for many purposes. First, a good valuation can give investor the accurate information, so that they can decide which stock to buy and which one to sell. Second, a detailed valuation is needed when an owner is contemplating a sale, merger, acquisition, joint venture or strategic partnership, etc. Third, the government or judicial authorities often require a valuation for legal matters such as business partnership disputes, the establishment and management of employment stock ownership plans. Finally, a well-presented valuation can help identify what is needed to increase the value of the company, attract new capital, or project potential proceeds from an initial public offering. Given these aspects, the importance of stock valuation can never be over estimated.

### **The Purpose of the study**

The central objective of this study is to find how to use the valuation techniques to value Korean corporation. A case study on SK Telecom will be used to give detailed study on company valuation in Korea.

The specific objectives of this study are the following:

- What kind of valuation methods are used in Stock Valuation?
- What is Free Cash Flow to the Firm (FCFF) Approach?
- How to use the FCFF to value the intrinsic value of Korean company?

### **Methodology and strategies of research**

The study will mainly base on information analysis. I will use the information from the companies' annual and quarterly reports, the annual

and quarterly reports of their major competitors, Telecom industry analysis, financial information Web sites such as Morningstar, Hoover's, Value Line, the Motley Fool, Wall Street Research Net and so on.

Although the intrinsic value depends on future expectations, understanding the industry and the company is the basic for valuation. A thorough historic analysis of the industry, the financial, strategic and competitive evolution of the company helps assess the forecast's consistency. Thus , I will analyze the trend of the industry, the macroeconomic environment the company operates in, the historic and strategic of the company, the income statement, balance sheet and the cash flows generated by the company, the evolution of the company's investments and financing, the financial health, and the future business risks that the company might face.

Based on the analysis, I will use the free cash flow to the firm approach and the ValuePro2002 software to value the company. This will include : develop a set of future cash flows for the companies based on expectations about the company's growth, net operating profit margin, income tax rates, and fixed and working capital requirements; estimate the WACC; discount the resulting cash flow estimates and total them to determine an enterprise value for the company as a whole; reduce the enterprise value by the amount of debt, preferred stock, and other claims of the corporation, and

divide that amount by the number of shares outstanding. This gives us the per-share intrinsic value of the corporation's common stock.

### **Systematic organization of the study**

The study consists of four main chapters. Chapter 1 of the study begins with the Philosophies and methods in corporate valuation. It will introduce fundamental analysis, technical analysis and modern portfolio theory (MPT). Fundamental analysis believes that a stock has a true or intrinsic value to which its price is anchored. Price may diverge from this value in the short run, but in the long term, price and intrinsic value will converge. The most popular methods in fundamental analysis are: *Target stock price analysis, relative value analysis and discounted cash flow analysis.* Technical analysts believe that there is no necessary relationship between a stock's price and its underlying intrinsic value. Short term stock price movements are influenced primarily by changes in market psychology and reflect the greed versus fear mentality of investors. Modern Portfolio Theory believe that stock price always reflect underlying intrinsic values due to the competitive forces in the stock market. Under this theory, the market is efficient because new information is very quickly incorporated into stock prices and there never are any undervalued or overvalued stocks.

Chapter 2 of the study will focus on introducing the Free Cash Flow to the Firm (FCFF) Approach. The *FCFE* model measures the cash flow left over after payments for working capital, capital expenditures, the interest and principal on debt, and dividends on preferred stock. These cash flows are then discounted at the company's cost of equity to arrive at the stock's value. FCFF is better in measuring returns than Earning Per Share (EPS), because with EPS calculations, no consideration is given to dividends or to the time value of money. EPS implicitly and explicitly ignores the risks and timing of returns that are dealt with in a discounted cash flow analysis. EPS also fail to incorporate expectations of future corporate performance.

Understand the company's business is one of the most critical factors in using the FCFF approach. To use the FCFF approach efficiently, we need a detailed industry studies and analysis of competitors in the industry in which the company operates. The discounted FCFF valuation approach uses a four-step process to value the stock of a company: (1) Forecast Expected Cash Flow, (2) Estimate the WACC, (3) Calculate the value of the corporation, (4) Make Investment Decision.

To forecast the expected cash flow, we need to know the history performance of the company and estimate the future growth rate, net operating profit margin, income tax rate, net investment, and incremental

working capital requirement. The second step in valuation is estimating the company's Weighted Average Cost of Capital. This includes estimating the weights and the cost of the common stocks, preferred stocks and the debts. The third step is calculating the value of the corporation. Since the value of a corporation is also affected by the short-term assets and short term liabilities. It is necessary to calculate the short-term assets and short term liabilities. The corporate value is: Total corporate value= Short-term Assets+ PV of FCFs during stage one (the sum of each year's FCFF after being appropriately discounted, using WACC) + PV of the residual value in final forecast year, discounted back to year 0. The last step is: calculating intrinsic stock value and make investment decision. In this study, I will use the ValuePro 2002 to calculate the value of the corporation, the value of equity and the intrinsic value of the corporation. After getting the implicit stock price, I will make investment decision. That is: If the implicit stock price is lower than the market price, we should sell the stock; if the implicit stock price is higher than the market price, we should buy the stock.

The third and the fourth parts are the case studying. In these two parts, I first introduce the global telecom industry, the macroeconomic environment in Korea, and Korea telecom industry. After this, I will analyze the SK Telecom, which includes the history of the company, its market position, corporate strategy, strategic risk & opportunities, and its

history performance. Based on the information, the prediction of the company's future development is given and the intrinsic value of the company is valuated.

## **Chapter I: Philosophies and Methods in Corporate Valuation**

To many people, the economics underlying the movements and price levels of the stock market are a mystery. At the end of trading each day, stock analysts attribute stock price movements to any number of factors, such as changes in interest rates, company earnings reports exceeding or falling short of expectations, some unexpected events and so on. What factors determine the absolute price of a stock is really puzzling for many market players.

Professional stock market participants apply a number of investment approaches and techniques. These philosophies range from the conservative buy-and-hold companies to the aggressive long/short strategies. I believe that stock valuation includes both art and science aspects. In the long run, stock prices will gravitate to their underlying intrinsic values.

Generally, stock market investment and valuation strategies can be classified into one of three groups: fundamental analysis, technical analysis and modern portfolio theory (MPT). The three philosophies have different

beliefs about the relationship between the stock prices and its underlying intrinsic value.

### **1.1 Fundamental analysis**

Fundamental analysis believes that a stock has a true or intrinsic value to which its price is anchored. Price may diverge from this value in the short run, but in the long term, price and intrinsic value will converge.

According to this philosophy, the company's current and future operating and financial performance determine the intrinsic value of a company's stock. Value is a function of revenue, growth, earnings, dividends, cash flows, profit margins, risk, interest rates and other factors. To assess a company's prospects, fundamental analysts evaluate overall economic, industry, and company data to estimate a stock's intrinsic value.

Fundamental analytic techniques are mainly used as the basis for long-term buy/sell decisions. The basic investment rule associated with fundamental analysis is: if a stock price is well below its intrinsic value, buy the stock; if the stock price is well above its value, sell the stock.

The most popular methods in fundamental analysis are: *Target stock price analysis*, *relative value analysis* and *discounted cash flow analysis*. *Target stock price* analysis first forecasts the future earnings per share (EPS) of a firm. This figure is then multiplied by a projected price/earnings (P/E) ratio to get a target stock price. *Relative Value Analysis* uses a measure of value, such as the price/earning ratio, price / book value, price/sale, the price/earnings/growth ratios, as yardsticks for comparisons of different companies with varying characteristics. Relative value analysis is often used in conjunction with the target stock price approach.

Although *Discounted Cash Flow Analysis* is used to value all types of fixed income investments (bonds, mortgages, etc.), it receives much less attention from the media as a method to value common stocks because it is difficult to explain the DCF technique in simple terms to stock investors. In this approach, a stock's value is the sum of the expected cash flows of the company, discounted at appropriate interest rates. This approach includes three models. The *dividend discount model (DDM)*, the *free cash flow to equity model (FCFE)* and the *free cash flow to the firm model (FCFF)*.

Under the *dividend discount model*, the value of a stock is the present value of the dividends that an investor expects to receive. Using the DDM approach, the analyst estimates future dividend growth and the required

rate of return on the stock, and discounts those expected dividends to arrive at a stock's value.

The *FCFE* model measures the cash flow left over after payments for working capital, capital expenditures, the interest and principal on debt, and dividends on preferred stock. These cash flows are then discounted at the company's cost of equity to arrive at the stock's value.

The final DCF model is the free cash flow to the firm approach—the focus of this paper. *Chapter II will give a detail introduction about this approach.*

## **1.2 Technical Analysis**

Technical analysts believe that there is no necessary relationship between a stock's price and its underlying intrinsic value. Short term stock price movements are influenced primarily by changes in market psychology and reflect the greed versus fear mentality of investors.

Technical analysts use the movements of historic stock price, volume of trading activity, and the price/volume aspects of related equity and debt markets to predict or anticipate the stock buying behavior of other market

participants. The behavior of other markets players is very important to technical analysts. Technical analysts believe that stock prices are influenced more by investor psychology and the emotions of the crowd than by changes in the underlying fundamentals of the company.

Technical analysts use the principle that supply and demand drive stock prices in the short run to predict the stock price. So, for a technical analyst, the rise of a stock's price is not necessarily because of better operating aspects of the company, but because of increasing demand for the stock and momentum in the company's stock price.

Technical analysis is used for short-term buy/sell decisions. The basic investment rule associated with technical analysis is: if your indicators signal that a stock's price will rise, buy the stock: if your indicators signal that a stock's price will fall, sell the stock.

### **1.3 Modern Portfolio Theory**

Modern Portfolio Theory believe that stock price always reflect underlying intrinsic values due to the competitive forces in the stock market. Under this theory, the market is efficient because new information is very quickly

incorporated into stock prices and there never are any undervalued or overvalued stocks.

This theory believes that investors cannot use past stock price information or public news releases of firm-specific information to find undervalued stocks. On average, no one can sleuth the market to detect undervalued stocks. Investors should not be bothered by searching for undervalued stocks. The principal to investment is choosing a risk level and diversify holdings among a portfolio of stocks.

## **Chapter II: Free Cash Flow to the Firm (FCFF) Approach**

As mentioned before, FCFF belongs to DCF approach. Free cash flow is equal to net operating profit after taxes minus net investment and minus increases in working capital. FCFF is calculated as following:

$$FCFF = NOP - Taxes - Net\ investment - Net\ change\ in\ working\ capital$$

$$*NOP = operating\ revenues - operating\ expenses$$

$$*Operating\ expenses = CGS\ (cost\ of\ goods\ sold) + SG\ \&\ A\ (sales\ and\ general\ administrative\ expenses) + R\ \&\ D$$

$$*Net\ investment = new\ investment - depreciation$$

$$*Working\ Capital = Accounts\ Receivable + Inventories - Accounts\ Payable$$

From a stock valuation standpoint, stockholders should be more concerned about the free cash flow to the firm rather than the profits, because on any

corporate investment, a corporation creates additional value for stockholders if and only if it earns a rate of return, after all net cash flow adjustments, which exceeds the corporation's weighted average cost of capital. This occurs only when the investment generates additional free cash flow to the firm. <sup>1</sup>

FCFF is better in measuring returns than Earning Per Share (EPS), because with EPS calculations, no consideration is given to dividends or to the time value of money. EPS implicitly and explicitly ignores the risks and timing of returns that are dealt with in a discounted cash flow analysis. EPS also fail to incorporate expectations of future corporate performance.

The FCFF approach can be used for any company, either government owned company or a private –owned one. The underlying assumptions of the FCFF approach is: the company will maintain a relatively constant capital structure. This implies that the company will have stable percentage of debt, preferred stock, and common stock in its market capitalization rations. This assumption affects the calculation of the company's WACC over time. As the market capitalization of a company increases, the amount of debt, preferred stock, and common stock should increase proportionately. If the company is a privately-owned one, the FCFF approach assumes that

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<sup>1</sup> Gary Gray, Patrick J. Cusatis, and J. Randall Woolridge gave this idea in their book “Streetsmart Guide to Valuing a Stock”.

company management will act in the best interests of its owners to maximize stockholder value. This implies that the cash inflows the firm receives will be reinvested only in profitable business projects, or else the free cash flow will be paid out to the stockholders. The term “reinvested in profitable business projects” means that those projects will create additional free cash flow for the firm, and therefore will earn a rate of return that is higher than the company’s WACC and will add to stockholder value.

Understanding the company’s business is one of the most critical factors in using the FCFF approach. To use the FCFF approach efficiently, we need a detailed industry studies and analysis of competitors in the industry in which the company operates. Answering questions, such as, “how is the company positioned? Who are its competitors? What is the quality and stability of the company’s management? What are the unique success factors to particular industries?” and so on, are very important for us to get the true value of the corporation.

The discounted FCFF valuation approach uses a four-step process to value the stock of a company.

## **2.1 Forecast Expected Cash Flow.**

The first step is forecasting expected cash flow. To do this, we need to make the most likely assumptions regarding the company's **growth rate, net operating profit margin, income tax rate, net investment, and incremental working capital requirement.**

### **Growth Rate**

When we talk about growth in the context of corporate valuation, we are most concerned about the corporation's growth of revenue. Applying the growth to revenue is better than applying the growth to earnings because revenue is subject to less manipulation than earnings. The current revenue of the corporation and the expected growth (positive or negative) of revenue during the excess return period are extremely important inputs for valuating a company. When we analyse the growth rate of company, we should compare: growth in company revenue with growth in industry revenue; how fast is company revenue growing absolutely, and relative to industry growth, and relative to GDP growth. Depend on the compare and other analysis, we need to decide the growth rate of the selected company.

As a rule, a corporation cannot forever grow at a rate appreciably higher than the growth rate of the economy in which it operates. It is impossible

for a company to grow its operations every year at an unreasonable high rate of growth. Growth stocks, which characterized by high price-to-earnings and low book-value to market -value ratio, will soon or later become normal stocks and may even become value stocks. Eventually, the growth rates for all companies begin to approach the growth rate for the economy in which they operate. So, the expected cash flows should be separated into two time periods. First, the excess return period in which the corporation generates cash flows from operation; and second, the residual value period—the time period after the excess return period, in which the corporation is not able to create additional free cash flow.

### **Net operating profit margin (NOPM)**

The NOPM is equal to the corporation's net operating profit (NOP) divided by operating revenue. To arrive at this ratio, we take operating revenue and subtract the costs of goods sold (CGS), selling, general and administrative expenses (SGA), and research and development costs (R&D) and divide the resulting number by operating revenue:

$$\begin{aligned} \text{NOPM} &= \text{Net Operating Profit} / \text{Operating Revenue} \\ &= (\text{Operating Revenue} - \text{CGS} - \text{SGA} - \text{R\&D}) / \text{Operating Revenue} \end{aligned}$$

The net operating profit margin of a company is a crucial determinant of its intrinsic stock value. Due to competitive pressures, changing technology, or the general economy, the NOPM of a company can fluctuate greatly from

year to year. To get a good number of the NOPM, it is necessary to calculate trends in the components, CGS, SG&A and R&D, all revenue, NOPM for other companies in the industry and / or for the industry as a whole. We also need to decide what are the important driving forces or success factors? What will happen to these factors in the future and why? Furthermore, we need to analyze why trends have taken place and whether they will continue.

For a company, if we only have accounting information from income statements and balance sheets, then we will have difficulty in forecasting by line of business. But if we can get internal data from the company, then we want to forecast each line of business. For SK Telecom, I am able to only forecast for the company's revenue for the entire company as a whole.

### **Income tax rate**

The free cash flow to the firm approach takes net operating profit, estimates an adjusted tax payment based on the corporation's income tax rate, and subtracts adjusted taxes to calculate NOPAT. Income tax rate is calculated as taxes paid divided by income subject to taxes. Sometimes, due to taking advantage of tax laws, a company's tax rate is significantly below the maximum marginal corporate tax rate. At other times, due to previous deferrals, the company's tax rate may be significantly above the maximum

marginal tax rate. If the company remains profitable, in the long run the tax rate should approach or average close to the maximum marginal tax rate.

### **Net Investment**

Net investment is the dollar amount needed to fuel the growth of the firm, and includes new investment in property, plant, and equipment, minus the depreciation expense associated with previous investments. Net investment is calculated as:

$$\text{Net Investment} = \text{New Investment} - \text{Depreciation Expense}$$

The information for this calculation can be found from the company's cash flow statement. For forecast purposes, we can forecast the most likely level of investment and divide by the revenue forecast. It is useful to read the annual report and other company studies to find out investment plans. We can forecast the depreciation either directly from past capital expenditure purchases and forecasted new capital expenditure purchases or indirectly by considering trends in past depreciation/revenue amounts.

### **Incremental working capital**

Working capital is needed to support the sales effort of a company.

Working capital is calculated as accounts receivable plus inventory minus accounts payable. If working capital is either increasing rapidly and / or

higher than elsewhere, this may be sign of trouble. This is an excellent early warning indicator. I will use historical trends to forecast working capital. Working capital is calculated by multiplies the increase or decrease in revenue.

### **Other factors needed to considered when calculating FCFF**

There are some other factors we need to consider when calculate FCFF. First, if there are significant long-term financial assets on the balance sheet, we either add the current value of the assets to the enterprise value by adding them to short term assets or estimate the future amount of cash that will be generated by holding the assets and add these to the FFCF's to be discounted. Second, if there are significant non-debt long-term liabilities on the balance sheet, such as long –term leases or accrued pension and health expenses, they can be added to short-term liabilities such that the remaining long-term liabilities are only interest-bearing liabilities, that is, debt. Third, if there are significant non-operating income and /or expenses. If they are not returns on long term investments, we should check to see that they indeed are special one-time items or whether the special charges occur year-after-year. For example, are legal payments by tobacco companies normal expenses or special expenses?

## **2.2 Estimate the WACC**

The second step in valuation is estimating the company's Weighted Average Cost of Capital. In accordance with generally accepted finance theory, a company's after-tax weighted average cost of capital is the rate that is used to discount the company's after-tax free cash flow. A company's WACC is the weighted average of the company's current cost of debt and equity calculated by using current debt, preferred stock and common stock market values. The weights always add to 1.0.

The percentage weights used in the FCFF approach to calculate the WACC are the percentages that the company plans to use in its capital structure. Generally, we use the current capital structure of the company to estimate what its capital structure will look like in the future.

The discount rates should be current rates demanded today by the market for securities with similar risk and cash flow characteristics. Because of the tax benefits associated with the deduction of interest payments by the corporation, debt is treated in a special manner in the FCFF approach. The after-tax cost of debt is used in the calculation of the corporation's WACC.

## **Cost of debt and debt outstanding**

Because a company's debt securities are risky investments, the after-tax cost of debt primarily is a function of three variables: the current yields associated with comparable-maturity risk-free debt, the default risk associated with the specific company's debt, and the company's income tax rate.

The spread to treasuries is the measure of default risk on a specific company's debt. For a large company with little operating risk and low financial leverage, the spread to treasuries might be quite small; for companies with considerable operating risk or high leverage, the spread to Treasuries might be quite large.

The best way to determine default risk is to see how a particular company's debt trades in the market and compare it on a spread basis to comparable-maturity Treasury yields. Another way to measure default risk and to estimate spreads is to use the default rating systems that are published by major credit rating agencies, such as Standard & Poor's corporation, Moody's Investor Services, and Fitch&Company.

A viable way of estimating the yield on debt of a company that does not have actively traded bonds is to examine the cost of outstanding traded debt from a default ratings standpoint for a similar company. Then use that yield as a proxy for the cost of debt of the company that is valued.

It is often difficult to find market value quotes for the outstanding debt of the corporation. Absent significant credit risk, the market value of debt does not diverge too greatly from the book value of debt. So, using the book value of debt does not significantly affect the valuation process.

### **The cost of Preferred Stock and Amount Outstanding**

Preferred stock is a hybrid financial instrument that usually represents a small portion of a company's capital structure. Preferred stock is an ownership claim on the assets of the corporation that is senior to common stock but is junior to that of debt. For the cost of preferred stock, we take an average of the after-tax cost of long-term debt and the after-tax cost of equity. For the amount of preferred stock, if it is quoted on an exchange, use market value, otherwise, use book value.

## **The Cost of Common Equity and amount outstanding**

The cost of common equity is the annual rate of return that an investor expects to earn when investing in shares of a company. We use the Capital Asset Pricing Model to calculate the Cost of Common Equity, that is:

$$\text{Expected Return} = \text{Risk Free Rate} + \text{Beta} * \text{Risk Premium}$$

The return of any risky common stock should be composed of three components:

1. A return commensurate with a risk-free security ( $R_f$ ) of a comparable term or maturity and that incorporates expectations of inflation; ( we use the treasury bond as the risk-free security)
2. A return that incorporates the market risk associated with common stocks as a whole ( $R_m$ ); and
3. A return that incorporates the business and financial risks of the company, known as the company's beta.

For the risk- free security, we use the treasury bond. In Korea, the 3- year treasury bond rate is used. The risk premium relates to the return and the risks associated with stocks in general. The risk premium is associated with the stock market as a whole, and that risk premium should be priced into

any equity investment. The risk premium is an expectation of the excess return associated with the investment in a diversified portfolio of common stocks versus the expected return of a risk-free security. It is the additional return that an investor expects to receive above the yield of a risk-free security to compensate for the price volatility associated with the stock market.

Beta is related to a specific stock, and measures the risk of the company relative to the risk of the stock market in general. Greater risk (operating or business), as measured by a larger variability of returns, increases a company's beta. Likewise, with greater leverage (higher debt/ value ratio) and increasing financial risk, the company's stock should also have a larger beta. With a larger beta, an investor should expect a greater return.

The beta of a firm of average risk in the stock market is 1.0. The beta of a firm with below-average operating risk, such as a firm operating in a regulated industry, is less than 1.0. The betas of firms with above-average operating risk are greater than 1.00.

For the amount of outstanding, we multiple the most recent price per share by the number of shares outstanding, generally use the number of fully diluted shares.

### **2.3. Calculate the value of the corporation**

The value of a corporation is also affected by the short-term assets and short term liabilities. In valuing a company, it is assumed that the long-term assets of the firm are illiquid or are completely devoted to generating future profits and cash flow for the firm. Therefore, long-term assets enter the valuation equation through NOPMs, and investment and depreciation ratios. Long-term liabilities of the company enter the valuation equation when they are subtracted from total corporate value. The most reasonable way to bring the balance sheet into play is through the difference of short-term assets versus short-term liabilities. Short term assets are added to the corporate value side of the equation and short-term liabilities are subtracted from total corporate value. The corporate value is: Total corporate value = Short-term Assets + PV of FCFFs during stage one (the sum of each year's FCFF after being appropriately discounted, using WACC) + PV of the residual value in final forecast year, discounted back to year 0.

### **2.4 Calculate the Intrinsic Stock Value and Make Investment Decision**

After we get the value of the corporation, we can calculate the total value of the equity, that is:

The total value of equity= enterprise value - short-term Liabilities - Long-term Debt - Preferred stock

With the total value of equity, we can get the implicit stock price by using equation:

Implicit Stock Price= Total value of Equity/no. of fully diluted shares of stock outstanding.

In this paper, the ValuePro 2002 <sup>2</sup> will be used to calculate the value of the corporation, the value of equity and the intrinsic value of the corporation.

After we get the implicit stock price, we can compare it with the market price and make investment decision. That is: If the implicit stock price is lower than the market price, we should sell the stock; if the implicit stock price is higher than the market price, we should buy the stock.

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<sup>2</sup> <sup>2</sup> The ValuePro 2002 approach uses a discounted cash flow (DCF) technique to value common stock. This software is an integrated spreadsheet program that consists of five screens: two input screens—the General Input Screen, and the Custom Input Screen; and three output screens—the Weighted Average Cost of Capital Screen, the General Pro Forma Screen, and the Custom Pro Forma Screen. ValuePro 2002 allows an analyst to control the cash flows and interest rate measures that are the essential ingredients for stock valuation. Analysts can change growth assumptions, profit margins, investment requirements and interest rates to see how different 'what if' scenarios affect a stock's value. The analysts decide what assumptions are reasonable and what are not, value the stock accordingly, and when to buy or sell.

For an investor, the investment decision should be based on a stock's price versus its value—not on 'growth' versus 'value' or 'high-tech' versus 'no-tech' categorizations. Buy undervalued stocks and sell overvalued stocks! ValuePro is the easy-to-use quantitative tool that will help investors to make this investment decision intelligently. For these reasons, I use the Value Pro 2002 in this paper.

## **Chapter III: Case Study --- Valuating SK Telecom Company**

### **3.1 Rationale for Model**

#### **3.1.1 Global Mobile Telecom Industry**

The mobile telecom industry has experienced very fast market growth combined with rapid technological change. The number of subscribers to mobile networks has grown at a rapid rate on a worldwide basis. During the 1990s the number of mobile subscribers worldwide increased by an annual rate of 50 per cent. In 2002, the number of world mobile subscribers for the first time exceeded the number of fixed lines. The mobile telecommunications industry has acquired as many users in some twenty years worldwide which took the fixed line telecommunications industry more than 120 years to achieve. Two factors have determined the extraordinary rapid development of this industry: technological progress and regulation.

In recent years, as the market becomes saturate in the developed countries, the competition among mobile operators is fierce. As a result, voice revenues have been diminished and non-voice revenues have become an increasingly important source of growth for mobile operation. With the saturated domestic market, mobile operators in developed countries try to

develop their business in emerging market.

### **3.1.2 Macroeconomic in South Korea**

Although growth momentum remains intact, with the economy expanding for the 14th consecutive quarter, South Korea is facing several challenges that have worsened the outlook somewhat. Firstly, growing unease over the North's nuclear weapons program, which has been exacerbated by recent tests, is a prime concern going forward. Even before the tests, South Korean Finance Minister Kwon O-kyu said that the increased security tensions could harm the economy by further discouraging spending by domestic firms and consumers, while keeping foreign investors at bay.

Falling consumer demand was reflected in lower production growth in the services industry in Q306, which grew by 3.6% y-o-y (0.5% q-o-q), down from 4.3% y-o-y (0.9% q-o-q) in Q206. Declining consumer confidence in recent months is largely attributed to the inflationary effects of high energy prices, rising debt servicing costs and growing credit risks. The Finance Ministry has revealed that credit card payments grew by 8.0% y-o-y in October 2006 - the slowest rise since October 2004. In addition, officials are concerned that slow job creation might undermine the projected recovery in domestic demand.

Aside from lackluster domestic demand, South Korea's export growth has also begun to slow, and external demand is forecast to soften further going forward. While resilient exports continue to support the economy, export growth slowed to 13.0% y-o-y (2.6% q-o-q) in Q3, from 16.3% y-o-y (6.2% q-o-q) in Q206. Recent data have indicated a continuation in this slowing trend, with overseas shipments rising by 11.5% y-o-y in October 2006, down from 21.3% y-o-y in September, representing the slowest annual rise in three months. Exports are likely to moderate further in 2007, as growth slows in the US and China - South Korea's two main export markets, accounting for two-fifths of total exports. In addition, although oil prices have lowered from record highs in mid-2006, still high crude costs, along with the continued strengthening of the won currency, could further constrain South Korea's export performance going forward.

However the economy still remains resilient. Industrial production expanded for a third consecutive month in October 2006, growing by 2.6% m-o-m, following monthly growth of 3.1% and 3.7% in September and August respectively. Furthermore, the Federation of Korean Industries' November Business Survey Index revealed that businesses are largely upbeat about future conditions, despite the increased security risks following North Korea's nuclear test on October 9 2006. The index rose to a seasonally adjusted 105.7 - a nine-month high - up from a revised 100.3 in October. A score over 100 indicates a positive outlook for the economy.

**Table 1: GDP - real growth rate of Korea**

Year	GDP - real growth rate
2003	6.20 %
2004	3.10 %
2005	4.60 %
2006	4.00 %
2007	4.80 %

Source: CIA World Factbook

### **3.1.3 Overview of Mobile Telecom Company in South Korea**

The South Korean mobile market has reached a point of saturation with mobile penetration of 87.3% in June 2007. The three main mobile operators in South Korea are SK Telecom, KTF (formerly known as KT Freetel) and LG Telecom. The market shares of the three mobile operators are as following:

**Table2: Market share of SKT, KTF and LGT**

Year	2007. 04	2007. 05	2007. 06
SKT	50. 45%	50. 45%	50. 47%
KTF	32. 01%	31. 97%	31. 93%
LGT	17. 54%	17. 58%	17. 61%

Sources: KTF website

The competition in the mobile industry is intensified in South Korea. SK Telecom and KTF are battling for market share. The increased marketing costs, as a result of the fierce competition, are causing both firms' profits to suffer. SK Telecom's net profit in the fourth quarter dropped to \$297 million in 2006 while the company's marketing expenses increased 52 percent from a year earlier. Meanwhile, KTF said its fourth-quarter net profit dropped to \$114 million from \$117 million a year earlier. Operator concerns over poor mobile growth - with 2006 showing a rise of 4.8% to just over 40mn users, and a similar level of growth expected in 2007 - have led to a greater focus from operators on generating stronger revenues. Market leader SK Telecom managed to report a 4.8% y-o-y increase in revenues for the year ended December 2006, reaching KRW10.651trn, while KTF reported similarly weak revenue growth of 4.2% y-o-y to KRW1.347trn.

The growth rates of revenue of these companies are as following:

**Table 3: growth rates of revenue of SKT, KTF and LGT**

<b>Company/year</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
<b>SKT</b>	<b>10.26%</b>	<b>1.93%</b>	<b>4.71%</b>	<b>4.83%</b>
<b>KTF</b>	<b>-4.59%</b>	<b>14.85%</b>	<b>3.79%</b>	<b>4.2%</b>
<b>LGT</b>	<b>-1.725</b>	<b>44.10%</b>	<b>9.35%</b>	<b>12.37%</b>

**Source: calculated from the income statements**

From the history trend of Revenue growth rate we can see that the growth rate of SK telecom decreased sharply in 2004, from 10.26 % in 2003 to 1.93% in 2004. Meanwhile, the growth rate of KTF and LG Telecom increased significantly. The growth rate of KTF increased from -4.59% in 2003 to 14.85% in 2004, and the growth rate of LG Telecom increased from -1.72% in 2003 to 44.10% in 2004. This was due to the government policy toward different telecom companies. In 2004 the government began to limit SK Telecom's market share to around 50% from over 50%, so that other companies' revenue grew faster in 2004, while SK Telecom's revenue decreased in 2004. I predict that this restriction will continue in the future.

Non-voice revenues have become an increasingly important source of growth for mobile operators, as they face a saturated mobile market and diminishing voice revenues. This has led both SKT and KTF to heavily invest in HSDPA (HSDPA, short for High-Speed Downlink Packet Access, is a new protocol for mobile telephone data transmission. It is known as a 3.5G (G stands for generation) technology. Essentially, the standard will provide download speeds on a mobile phone equivalent to an [ADSL](#) --Asymmetric Digital Subscriber Line--line in a home, removing any limitations placed on the use of your phone by a slow connection), in the hope of encouraging further use of music, video and other data-rich services. SK Telecom spent over half of its capital expenditure budget on HSDPA in 2006, and will invest a further KRW610bn this year. The

technology allows for the faster delivery of mobile internet and multimedia downloading than 3G, leading to operator assumptions that this will generate stronger non-voice revenues. Meanwhile, LG Telecom is keen to operate a 3G network, although this is pending approval from the Ministry of Information and Communication --there is no independent regulatory body in South Korea as policy and regulation are dealt with by the Ministry of Information and Communication (MIC)

While the slowdown in growth in mobile market has meant that operators have been forced to develop new innovative services and introduce newer technologies to the market, government support has been lacking. A measure of this is suggested in the announcement that mobile operators will need to contend with a 30% cut in charges for some mobile internet services - measures introduced by the government in January 2007 in order to curb rising mobile service fees. Given that operators are deploying data heavy services in order to gain revenues, this recent government measure will be seen as an extra burden.

The regulation environment also put the South Korean mobile industry in a disadvantage. In July 6, 2007, South Korea's Ministry of Information and Communication announced that the country is considering a move to allow MVNOs and other new wireless carriers into the market. The aim is to help cut mobile tariffs and promote competition. The government is currently

strategizing on how to implement a system to allow the MVNOs to lease capacity on the incumbent networks. Politicians, civic groups and the like have been clamoring recently that the incumbent carriers: SK Telecom, KT Freetel and LG Telecom are overcharging their subscribers.

### **3.1.4 SK Telecom**

#### **The company**

SK Telecom, today South Korea's largest wireless carrier, was created by the country's government in 1984 as Korea Mobile Telecommunications Services Co. In 1988 it became Korea Mobile Telecommunications Corp (KMT). In 1994, SK Group becomes the largest shareholder of KMT, and in 1997, the company changed its name to SK Telecom.

The company has long been a technological fast mover and sometimes even a leader. In October 2000 it became the second operator in the world (behind NTT's DoCoMo in Japan) to launch a commercial 3G service employing W-CDMA technology. And in January 2002 data transmission speeds were given a boost by the launch of the world's first CDMA2000 1xEV-DO network. The company is also credited with the commercialization of world's first HSDPA service, a 3G mobile telephony protocol, in 2006.

SK Telecom has also moved beyond mobile phones, jumping on global trends in personal communications and entertainment. SK Telecom's interests now range from portals and music streaming to banking services and m-commerce. There's NATE, a wired and wireless integrated messaging service; June, a multimedia service; and MONETA, a mobile banking service. In addition, the carrier provides satellite DMB to subscribers through its subsidiary, TU Media Corp. SK Telecom also offers a variety of internet services, many through another subsidiary, SK Communications.

Like most developed countries, SK's home market for mobile phones is all but saturated as four out of five people carry mobile phones. As a result, SK Telecom is channeling considerable effort into overseas investments, including the growing markets of China and Vietnam. The company has also tackled the United States market, where its MVNO joint venture with EarthLink, called Helio, is struggling.

SK Telecom reported revenues of KRW 10,650.9bn (approximately US\$11.3bn) during the fiscal year ended December 2006, up 4.8% over 2005. Operating profit was KRW 2,584.4bn (about US\$2.7bn) in 2006, a decrease of 2.6% compared to 2005. While the company's operating

margins were still a healthy 39.74%, the prospects for maintaining this level of profitability look less than solid now than they did a few years ago.

### **Market position**

Despite the intense competition chipping away at its margins, SK Telecom has maintained a domestic market share of just over 50%, ahead of domestic competitors KTF and LG Telecom. About 20m people subscribe to its mobile phone services.

Since its launch in 2002, SK Communications has grown into one of the most popular Internet portals in Korea. Its center piece, Cyworld, hit 20m members in 2006, and is now the largest community site in Korea. SK Communications also provides the country's top instant messaging service, NATE.on, which has more than 13m users. In 2006 the NATE.com portal was re-launched as a customer-focused portal with an emphasis on social bookmarking, personalized content and community messaging.

TU Media Corp was established in December 2003, introduced a new digital media service, satellite Digital Multimedia Broadcasting (DMB). Subscribers can now view satellite TV broadcasts on their portable handsets or via vehicle-mounted terminals. By the end of 2006, the number

of subscribers with access to nearly 40 channels had passed 1m, up from 372,000 in 2005. As well as covering cities, TU Media provides service on express highways, Seoul's subways and major routes including the express train from Seoul to Busan.

SK Telecom's popular music service, MeLon, currently attracts an audience of more than 7m people. MeLon lets users to download or stream music over the internet, and on their mobile phones, portable media players and even on digital cameras.

Abroad, S-Telecom, SK Telecom Vietnam business launched in mid 2003 and the first CDMA mobile phone service in the country, provides services to some 64 cities under the S-Fone brand. S-Fone subscribers reached 2m in April 2007, a little over three years after its start. More recently the company deployed EV-DO wireless internet services in five major cities, including Hanoi and Ho Chi Min City.

### **Corporate strategy**

As well as moving into new geographical markets, SK Telecom has started to pursue interests in other areas of the telecommunications supply chain, including forays into phone hardware.

SK Telecom first entered China in 2000, but stepped up its presence in the country in February 2004 when it formed a joint venture with China Unicom, for the roll out of wireless internet services. Known as UNISK, the venture was the first between a foreign and local company in China. Building on that relationship, in 2006, SK Telecom bought US\$1bn worth of convertible bonds of China Unicom Hong Kong, and agreed to co-operate in joint sourcing of handsets, as well as the development of new services, platform development, marketing and distribution, customer relationship management and network development. It is expected that companies including Samsung, LG and Motorola will buy the handsets.

In the US, SKs Helio venture operates on the premise of being a mobile virtual network operator (MVNO), using CDMA 1xEVDO network capacity leased from Sprint Nextel. Central to its thrust has been the introduction of handsets with functionalities previously unavailable in the American market. So far, however, the reception has been less than overwhelming.

SK Telecom is taking its online businesses to the global market as well. In 2006, SK Communications launched Cyworld services in China, Germany, Japan, Taiwan, the US and Vietnam. The company is building a portfolio

of high-quality content providers, namely education company Etoos; consumer shopping services under the Cymarket brand, leveraging Cyworlds network and traffic; gaming subsidiary SK i-media; and Egloos, a blogging service. Still in the online domain, SK Telecom has acquired a 24.4% stake in the high profile online search engine, Empas.

### **Strategic risks / opportunities**

SK Telecom has a sound track record of technological leadership, and its ability to forge relationships with overseas business partners is well demonstrated. However, the success of its foray into the highly competitive US market remains far from certain.

In July 2007 the company said it would invest an extra US\$100m in Helio, its loss-making US wireless joint venture with EarthLink, which said it would inject the same amount. Helio's aim is to crack the highly competitive US market by going after young customers.

Days later, SK Telecom made fresh headlines amid rumors it was preparing a takeover bid for Sprint Nextel Corp, the third largest US wireless firm. Bankers and analysts said a full takeover was not feasible given SK Telecom's market capitalization of US\$18bn was less than a third of Sprint

Nextels US\$62bn, and indeed management in Seoul issued a formal denial of the reports. Industry watchers did not rule out a partial investment, however, given the company's desire to boost its business in the United States.

In any case, SK Telecom has little choice but to expand into new markets, given the saturation of its home base. To date SK Telecom has done well at innovating new services to keep its audience interested, but the domestic market has its limits.

Furthermore, SK Telecom is currently subject to a policy review by Korea's Ministry of Information. Competitors have argued that SK Telecom is still too dominant in the domestic market, to the detriment of competition. SK Telecom could well sustain its generally robust business and financial profile over the medium term, but the outlook could change if the government finds fault with the company's impact on the marketplace, and substantial new competition is introduced.

## **3.2 Model Calculations**

### **3.2.1 Calculation of the Future Expected Free Cash Flow**

History performance of SK Telecom

The history revenue growth rates of SK Telecom are as following:

**Table 4: History revenue growth rates of SK Telecom**

							Unit: Billion Won		
	Year	1999	2000	2001	2002	2003	2004	2005	2006
Revenue		4285	5760	6227	<b>8634</b>	<b>9520</b>	<b>9704</b>	<b>10161</b>	<b>10652</b>
Operating Expense		3996	4125	4023	5950	6440	7344	7508	8066
Operating Income		289	1636	2204	2684	3080	2360	2654	2584
Other Income (loss) Net		184	-275	-443	-504	-366	-244	-99	-562
Net Income before Income tax		473	1361	1761	<b>2180</b>	<b>2714</b>	<b>2116</b>	<b>2555</b>	<b>2022</b>
<b>Yearly Growth Rate of Revenue</b>			<b>34.42%</b>	<b>8.11%</b>	<b>38.65%</b>	<b>10.26%</b>	<b>1.93%</b>	<b>4.71%</b>	<b>4.83%</b>

The 7-year compound average growth rate:

$$(10652/4285)^{1/7} - 1 = 13.90\%$$

The 5-year compound average growth rate:

$$(10652/6227)^{1/5} - 1 = 11.33\%$$

The 3-year compound average growth rate:

$$(10652/9520)^{1/3} - 1 = 3.80\%$$

The history NOPMs of SKT are as following:

**Table 5: The history NOPMs of SKT**

NOPM=(Operating Revenue-CGS-SGA-R&D)	unit: Billion Won								
	1999	2000	2001	2002	2003	2004	2005	2006	
Revenue	4285	5760	6227	<b>8634</b>	<b>9520</b>	<b>9704</b>	<b>10161</b>		
Operating Expense	3996	4125	4023	5950	6440	7344	7508	8066	
CGS,SGA,R&D	3325	3214	2925	4535	4952	5644	5995	6419	
Depreciation	671	911	1098	1415	1488	1700	1513	1647	
Operating Income	289	1636	2204	2684	3080	2360	2654	2584	
Other Income (loss) Net	184	-275	-443	-504	-366	-244	-99	-562	
Net Income Before Income Taxes	473	1361	1761	<b>2180</b>	<b>2714</b>	<b>2116</b>	<b>2555</b>	<b>2022</b>	
<b>NOPM</b>	<b>22.40%</b>	<b>44.20%</b>	<b>53.03%</b>	<b>47.48%</b>	<b>47.98%</b>	<b>41.84%</b>	<b>41.00%</b>	<b>39.74%</b>	

Decreasing growth rates along with shrinking NOPMs is not good sign for SK Telecom. It appears that competitors are successfully attacking the wireless industry domain where SK Telecom was once the dominant provider. Also, the current government policy is not in favor of SK Telecom. Politicians and civic groups have argued that existing operators are overcharging users and want to introduce new competitors. South Korea's Ministry of Information and Communication (MIC) has indicated its interest in allowing new mobile service providers to enter the highly developed market to raise competition and help cut prices. New entrants would take the form of a mobile virtual network operator (MVNO) by leasing capacity on the existing networks of the country's three national operators' SK Telecom, KTF and LG Telecom. MVNOs have fewer overheads as they use existing networks, while upgrades are the responsibility of the operator they lease the network from. This enables them to offer lower mobile tariffs, which has the potential to set the market up for a price war. Also, as a firm increases in size it becomes more and more difficult to keep growing at an extraordinarily high growth rate. The growth rate eventually has to converge to or go below the economy's growth rate. But on the other hand, there is still room for SK Telecom to increase its revenue through the 3G service and its oversea market in China, Vietnam and other countries. So, I set the growth rate as 3.6%.

### **SK Telecom's Excess Return Period**

The length of the excess return period should correspond to the time period over which the investor expects the corporation's business strategy to be successful. This means that the strategy will generate free cash flow- it will earn a rate of return on new investment in excess of the company's WACC. Business strategies based on patent protection, superior marketing channels, or valuable brand names should have relatively longer-term excess return period. SK Telecom has good products and name recognition. It also keeps advanced in technology development. However, intense competition in the mobile market has make it resulted in shrinking profit margin and lower sales growth. So, I use a 7-year excess return period.

### **NOPM**

The five year history NOPM of SK Telecom is as following:

**Table 6: The five year history NOPM of SK Telecom**

Year	Revenue	NOP	NOPM
2002	8634	4099	47.48%
2003	9520	4568	47.98%
2004	9704	4060	41.84%
2005	10161	4166	41.00%
2006	10652	4233	39.74%

SK Telecom has shown a pattern of decreasing NOPMs. This reflects the increasing market competition and the difficulty for SK Telecom to further improve its profit. I assume that SK Telecom's NOPM will decrease to 36% for the foreseeable future.

### **Income Tax Rate and Adjusted Taxes**

The history of the income tax rate for the latest 5 years of SK Telecom is as following:

**Table 7: Income tax rate of SK Telecom from 2002-2006**

<b>Year</b>	2002	2003	2004	2005	2006
<b>Income before Income tax</b>	2180	2714	2116	2555	2022
<b>Income taxes</b>	669	771	621	683	575
<b>tax rate</b>		28.41%	29.35%	26.73%	28.44%

I believe that SK telecom will continue to be profitable, so I choose the average five year tax rate of 28.72% for the valuation purpose.

### **Net Investment**

Net investment is the dollar amount needed to fuel the growth of the firm. It includes new investment in property, plant, and equipment, minus the depreciation expense associated with previous investments. Using the cash

flow statement, I calculated the investment and depreciation rates as following:

**Table 8: Investment and Depreciation History of SK Telecom from 2002-2006**

**In Billion Korean Won**

Year	Revenue	Invest- ment	% Investment	Depre- ciation	% Depreciation	Net Investment
2002	8634	1957	22.67%	1514	17.54%	443
2003	9520	1611	16.92%	1612	16.93%	-1
2004	9704	1570	16.18%	1670	17.21%	-100
2005	10161	1383	13.61%	1634	16.08%	-251
2006	10652	1467	13.77%	1648	15.47%	-181
five year average			16.63%		16.65%	

As we can see, over the last 5 years, SK Telecom has invested 16.63% of revenue in the purchase of property, plant, and equipment and has expensed 16.65% of revenue in depreciation. The net investment of the company is -0.02% of revenue. It is quite not possible for a company using negative investment to development its business. So, I calculated the seven year average data as the following:

**Table 9: 7 years average investment and depreciation rate of SKT**

**In billion Korean Won**

Year	Revenue	Invest- ment	% Investment	Depreciation	% Depreciation	Net Investment
2000	5760	1979	34.36%	925	16.06%	1054
2001	6227	1957	31.43%	1158	18.60%	799
2002	8634	1957	22.67%	1514	17.54%	443
2003	9520	1611	16.92%	1612	16.93%	-1

2004	9704	1570	16.18%	1670	17.21%	-100
2005	10161	1383	13.61%	1634	16.08%	-251
2006	10652	1467	13.77%	1648	15.47%	-181
Seven year average			21.28%		16.84%	

According to the table above, over the last seven years, SK Telecom has invested approximately 21.28 percent of revenue in the purchase of property, plant, and equipment and has expenses 16.84 percent of its revenue in the way of depreciation. In the foreseeable future, SKT still needs a lot of investment to develop the HSDPA and other technology to attract customers and to develop its overseas business. For these reasons, I take the seven year average of investment and depreciation rates for the excess return period of the valuation.

### **Incremental Working Capital**

Working capital is needed to support the sales effort of a company. Working capital equals accounts receivable plus inventory minus accounts payable. The history working capital of SK Telecom is shown as following:

**Table 10: Five-year working capital history of SK Telecom**

<b>In billion Korean Won</b>						
Year	Revenue	Acct. Rec.	Inventory	Acct. Pay.	Working Capital	% Working Capital
2002	8634	2100	11	1588	523	6.06%
2003	9520	2250	8	1118	1140	11.97%
2004	9704	2928	11	1071	1868	19.25%
2005	10161	2941	6	972	1975	19.44%
2006	10652	2957	16	1108	1865	17.51%
5-year average						14.85%

From the above table we can see that SK Telecom has a significant amount of cash tied up in the working capital- an average of 14.85 percent of revenue. For the estimate of incremental working capital, I make projections that show working capital expanding at a rate of 14.85 percent times the yearly increase in revenue.

### **Free Cash Flow to the Firm**

I use the Value Pro2002 software to get the Discounted Free Cash Flow to the Firm. See the following:

**Table 11: Discounted Free Cash Flow to the Firm of SKT**

<b>Value Pro2002</b>			
<b>General Pro Forma—Screen</b>			
<b>7—Year Excess Return Period</b>			
<b>SK Telecom</b>			
Disc. Excess Return Period FCFF	<b>12524</b>	Total Corporate Value	<b>36846</b>
Discount Residual Value	<b>20133</b>	Less Debt	<b>-2273</b>
Short –Term Assets	<b>4189</b>	Less Preferred Stock	<b>0</b>
Total Corporate Value	<b>36846</b>	Less short-term liabilities	<b>-3012</b>
		Total Value to Common	<b>31561</b>
		Equity	<b>₩388682</b>
		Intrinsic Stock Value	

1	2	3	4	5	6	7	8	9	10	11	12	13
					N							
					O				Chang	F		
	12				P			Chang	in	C		Dis-
	months			Adjust	A		Depre	In	working	F	Disc	counted
	Ending	Reve.	NOP	Taxes	T	Invest.		invest	capital	F	factor	FCFF
0	07/20/07	10652										
1	07/20/08	11035	3973	1141	2832	2348	1858	490	57	2285	0.915	2090
2	07/20/09	11433	4116	1182	2934	2433	1925	508	59	2367	0.837	1981
3	07/20/10	11844	4264	1225	3039	2520	1995	526	61	2452	0.765	1877
4	07/20/11	12271	4417	1269	3149	2611	2066	545	63	2541	0.700	1779
5	07/20/12	12712	4576	1314	3262	2705	2141	564	66	2632	0.640	1686
6	07/20/13	13170	4741	1362	3380	2803	2218	585	68	2727	0.590	1598
7	07/20/14	13644	4912	1411	3501	2903	2298	606	70	2825	0.540	1514
	Residual	13644	4912	1411	3501	2298	2298	0	0	37567	0.540	20133

Free cash flow includes excess return period and the residual value. All of the free cash flow is discounted to the present value by using the discount factors.

### 3.2.2 Estimate the Weighted Average Cost of Capital

#### Market Capitalization

SK Telecom's capital structure as of July 20 includes debt and common stock. I use its long term debt at December 31, 2006 for its long term debt, which is 2273 billion. The number of common shares outstanding was 81,194,000. The market price for the stock was 219,000 Korean Won per share on July 20, 2007. The market equity of SK Telecom is:

$81194000 \times 219,000 = 177815$  billion. The Market Capitalization of SK Telecom is calculated as following:

	Market Capitalization (billion Won)	
	Market Value	
	Total	%
Debt	2273	1.26%
Common Stock	177815	98.74%
Total Capitalization	180088	100.00%

### **The cost of Common stock and Shares Outstanding**

The cost of the common stock equals the risk free rate plus the specific stock's beta, times the equity risk premium. I use the 3 year Korean Bond rate 4.94 % as the risk free rate. I estimate the Market Risk Premium as 5.6%. I check different websites on the Beta of SK Telecom, and estimate it as 0.9<sup>3</sup>

Expected Return on SK Telecom =  $4.94 + 5.6 * 0.9 = 9.98\%$

According to the market, the total share outstanding was 81,194,000 on July 20, 2007.

### **The After –Tax Cost of Debt and Debt Outstanding**

To get the after-tax cost of debt, we need to know the current yields associated with comparable-maturity risk –free debt, the default risk associated with the company and the income tax rate. We already know the rate of risk-free debt is 4.94 and the company tax rate is 28.72%. The credit rating of SK Telecom is AA. (Fitch & Company). The financial leverage of

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<sup>3</sup> According to the 5 years end of monthly stock return of SK T in the FnGuide, I calculated the average five year beta of SK Telecom, and get Beta=0.8. I think that with the increased competition and requirement of high technology, the risk of SK Telecom will be a little bit higher in the long future, so, I set Beta 0.9.

SK Telecom is very low—11.33%. So, I estimate the spread to treasuries as 0.9. Using the Value Pro2002, we get the Weighted Average Cost of Capital as following:

**Table 12: Weighted Average Cost of Capital Screen of SKT**

**Value Pro 2002**

**Weighted Average Cost of Capital Screen**

**SK Telecom**

**Cost of Common Equity**

10-year Treasury Bond Yield	4.94
Company Specific Beta	0.9
<u>Equity Risk Premium</u>	<u>5.6</u>
<b>Cost of Common Equity</b>	<b>9.98</b>

**Market Capitalization and After-Tax Weighted Average Cost of Capital**

	Current yield	After Tax Yield	Market Value(Won)	% Capitaliza tion	Weighted After-tax yield
<b>Long-Term Debt</b>	5.84	4.16	2273	11.3%	0.47
<b>Common Stock</b>	9.98	9.98	17783	88.7%	8.85
<b>Total</b>			20055	100%	9.32

### 3.2.3 Calculate Intrinsic Stock Value and Making Investment Decision

I use the Value Pro 2002 to get the intrinsic stock value. I put all the relevant figures calculated from the former part into the Valuation Program.

With these figures, the program shows the market value of the SK Telecom stock is **388682.07 Won** per share. See the figure below

**Table 13: Intrinsic Stock Value of SK Telecom**

Valuation Date: July 20, 2007

Value pro 2002

General Input Screen

Intrinsic Stock Value ₩388682.07

General Inputs

Company Ticker	SK Telecom	Depreciation Rate (% of Rev)	16.84
Excess Return Period (years)	7	Investment Rate (% of Rev)	21.28
Revenues (₩billion)	10652	Working Capital(% of Rev)	14.85
Growth Rate (%)	3.6	Short-Term Assets(₩Billion)	4189
Net Operating Profit Margin (%)	36	Short-Term Liabilities (₩Bill)	3012
Tax Rate(%)	28.72	Equity Risk Premium(%)	5.6
Stock Price (₩)	219000	Company Beta	0.9
Shares Outstanding (Billion)	0.0812	Value of Debt Out (₩billion)	2273
10-year Treasury Yield (%)	4.94	Value of Pref. Stock out (₩bill)	0
Bond Spread to Treasury (%)	0.9	Company WACC	9.32
Preferred Stock Yield (%)	0		

Compared with the current market stock price, the intrinsic stock value ₩388682.07 is far beyond the current market price ₩219,000 per share. Based on the valuation, I recommend a strong buy.

## **V. Summary & Conclusion**

This paper introduced three valuation methods. The focus of this study was on the case study by using free cash flow to the firm approach. The valuation model used in this paper is ValuePro2002. This model is very useful for discounted cash flow valuation.

In the Value Pro 2002 model, the most important factors which affect the corporate value are growth rate, NOPM, and company beta. For more than seven years, SK Telecom is able to realize remarkable profit and keep its growth rate to increase the shareholder value and is well positioned for future growth. Nevertheless, the decreased growth rate and NOPM reflects the increasing competition in this industry. The premiums that the company has enjoyed are not sustainable in the long-term by default. For this reasons, lower than history average growth rate and NOPM are employed in the valuation model.

The history stock performance of SK telecom is showed below:



We can see that since 2001, there has been no big change for the price of SK Telecom. In other word, for a long time, the market value is far below the intrinsic value. Why is SKT Market Value so low, and for such a long time? The answers may lay on the “Korea” Factor and the Government attitude, which is not in favor of its business.

Currently most profit comes from basic cellular, but as this market approaches saturation, the development of future growth of SKT should come from non-voice service, such as cellular value added, wireless internet, internet banking and other new business. Also, as the developing room is limited in Korea, global expansion is very critical for SK Telecom’s future development.

According to the analysis and the Value Pro 2002 model, we got the intrinsic value of SK Telecom is far above its current market value. Based on the valuation, I recommend a strong buy.

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