[[1]](#footnote-2)ECON 255 Spring 2022

Project 8: *Gordon Growth Model*

*See the syllabus for more information about how I grade these assignments.*

**Part I. Stock Price Using GGM**

Economic theory teaches that whenever you buy something, it is reasonable to assume that the amount you pay for the good will reflect what you expect to receive in utility from owning and using the good. Likewise, when you buy a share of common stock, it is reasonable to assume that what you pay for it should be reflective of what you expect to receive from it in the future. In finance, this is referred to as your return on investment, and what you receive from owning common stock are dividend payments in the future. Moreover, since common stock never matures, dividends provide an infinite stream of future cash flows. Therefore, just like in our bond models, these future dividend payments can be discounted and summed to arrive at a fair stock price today.

1. Research the Gordon Growth Model (GGM) and explain it in common-sense terms. Provide your discussion on the Answer Sheet below (AS1). Make sure you fully cite your sources.

**Part II. Background on Calculating *i* Using CAPM**

The Capital Asset Pricing Model (CAPM) is often used in finance to calculate the required rate of return for any risky asset. Your required rate of return is the increase in value you should expect to see based on the inherent risk level of the asset. Here is how it works.

The beta coefficient (beta or ***b***) is a measure of market risk. As a result, we can use beta to determine the required return for the GGM.

Assume the required return (***i***) has two components:

1) The nominal risk-free rate (***rnrf***) that an investor can earn on a risk-free security. In the United States a U.S. Treasury bill is often used as the ***rnrf*** for short-term investments, while a U.S. Treasury note or bond is often used as the ***rnrf*** for long-term investments.

2) The risk premium. The risk premium is also composed of two parts:

1) The additional return that investing in securities offers above the risk-free rate. The additional return is the extent to which the return in the market (***rm***) exceeds the nominal risk-free rate (***rm – rnrf***).

2) The volatility of the particular security relative to the market as a whole (i.e., the beta). Use the beta data to compute the required return for each company and then compare it to the current stock price of that company. *Note that we will be learning more about beta in Chapter 10 of the text.*

Thus, the required return ***(i)*** is

**Equation 1**

**Part III. Analysis**

1. Find bond yield data from the U.S. Treasury. Since we are investing for the long-term, we will use the 10-year Treasury Note rate for this project. This will be your value for (AS2). The current daily yield curve rates can be obtained on the U.S. Department of Treasury’s website (<https://home.treasury.gov/>). Make sure that you use the nominal rate, not the real rate, in your calculation.
2. Use Bloomberg to obtain the ten-year (weekly) raw beta coefficients (AS3) for the following 10 companies:

|  |  |
| --- | --- |
| Colgate-Palmolive | IBM |
| Consolidated Edison | Cigna |
| Coca-Cola | Procter and Gamble |
| DuPont | Merck |
| Johnson & Johnson | Intel |

After typing the ticker name for any of the given 10 companies in the command line, click the green “Search” button. Type “beta” and select “Historical Beta”. Be sure and use the DJIA as the “Relative Index” in Bloomberg.

1. Use the “FA” function in Bloomberg to obtain the 10-year average return in the DJIA (INDU). Use the “Return on Equity” ratio and set periodicity to “Annuals” for 2012-2021. Use this as your ***rm*** (AS4).
2. Apply Equation 1 and use the bond data from the US Treasury, and the beta data and DJIA market return data from Bloomberg, to calculate ***i*** for each of the ten companies (AS5).
3. For the ten DJIA companies above, find ten years of dividend data from Bloomberg. Use the DVD command for any of the 10 companies above.
4. Use Bloomberg and the methodology demonstrated in class to calculate the 10-year dividend growth rate ***g*** (AS6).
5. Use your 10-year dividend growth rate, ***g***, and your calculation of ***i*** to compute the GGM stock price (AS7) for each company and then compare it to the current stock price of that company.

Use the following formula for your calculations:

**Equation 2**

where ***P*0**is the theoretical stock price, ***D*1**is the next period dividend (annualized) based on the 10-year historical dividend growth rate, ***i*** is your required rate of return based on the CAPM method described above, and ***g*** is the growth rate of the dividend, computed as shown in class (Step 7). *Recall that for GGM to work,* ***i*** *must be greater than* ***g****.* Show all data and calculations in Table 1 of the Answer Sheet below.

1. Use Bloomberg to find the most recent closing price for each of the 10 companies above (AS8).

**Part IV. Explanation**

1. Discuss why differences between the theoretical stock prices and the actual stock prices exist. (AS10)

**Part V. Submission**

1. When you have completed the assignment, save it as GGMInsertYourLastNameHere.docx (i.e., GGMSmith.docx) and submit it on I-Learn by the day and time noted on the course schedule. All grading will be based on the Project Grading Rubric posted on I-Learn and using the format given above and demonstrated in class--no other format is acceptable for grading purposes. You will be graded on the correctness and completeness of your work, exactness in following all instructions, and the professional appearance of your work (including typos, grammatical errors, and lack of citing references). **I do not accept late work.**

**Project 8 – Gordon Growth Model** **Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Answer Sheet**

AS1. What is the Gordon Growth Model?

The Gordon Growth Model is used to determine the relationship between growth rates discount rates and valuation. It values a price of a share with constant growth in dividend payments. From Walkstreet Mojo with an article titled “What is the Gordon Groeth Model” it says “Gordon Growth Model is a type of dividend discount model in which the dividends are factored in and discounted.” It is good for company’s that are stable and is generally easy to understand.

Table 1. (AS2-AS8)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **(AS2)*rnrf***  **(%)** | **(AS3)**  ***beta*** | **(AS4)**  ***rm***  **(%)** | **(AS5)**  **Calculated *i* (%)** | **(AS6)**  **10-Year Dividend Growth Rate *g***  **(%)** | **(AS7)**  **GGM**  **($)** | **(AS8)**  **Most Recent Closing Price**  **($)** |
| **CL** | .33 | .55 | 2.34 | 1.4355 | 4.43 |  | 74.16 |
| **ED** | .33 | .22 | 3.67 | 1.0648 | 2.65 |  | 88.25 |
| **KO** | .33 | .67 | 3.16 | 2.2261 | 8.93 |  | 59.67 |
| **DD** | .33 | 1.18 | 2.54 | 2.9378 | 1.66 |  | 60.35 |
| **JNJ** | .33 | .66 | 2.58 | 1.815 | 14.1 |  | 169.99 |
| **IBM** | .33 | 1.00 | 4.70 | 4.7 | 8.17 |  | 137.06 |
| **CI** | .33 | .77 | .32 | .3223 | 59.42 |  | 247.10 |
| **PG** | .33 | .39 | 2.70 | 1.2543 | 5.13 |  | 132.51 |
| **MRK** | .33 | .37 | 2.99 | 1.3142 | 5.69 |  | 84.63 |
| **INTC** | .33 | .60 | 2.49 | 1.626 | 5.43 |  | 38.65 |

AS9. Show the following calculations for **GS** (i.e., explain what you did and show your numbers):

|  |  |
| --- | --- |
| **Dividend Growth Rate *g*:** | (Year-year)-1 |
| **Required Rate of Return *i*:** | **Expected dividend payment / Stock price + Forecasted dividend growth rate** |
| **Theoretical Stock Price GGM:** | Dividends per share/required rate of return- dividend growth rate |

AS10. Discussion of Differences in the Theoretical Prices and the Most Recent Closing Prices:

Because it is theoretical it gives us an idea of where it may land. It is not a guarantee, but an estimate and we use the GGM to help us find this.

1. [↑](#footnote-ref-2)