



# 45th Annual Taxation Conference

Appraisal for Ad Valorem Taxation of  
Communications, Energy and  
Transportation Properties

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## **Long-Term Growth Rate in the Income Approach**

Aaron M. Rotkowski, CFA, ASA, CBA

Willamette Management Associates

Michael Mangan, JD

Garvey Schubert Barer

# Disclaimers

- **Opinions are our own, and do not necessarily represent the opinions of our respective firms**
- **All specific examples were selected because the companies are publicly traded and have abundant data available**
- **For some topics, we have purposely endeavored to use examples from companies or court cases that are not represented at this conference**

# Income Approach

- The value of an asset or business is the present value of the prospective economic income associated with the ownership of that asset or business

- Yield capitalization method formula:

$$\text{Value} = \text{PV of Discrete Period Income} + \text{PV of Terminal Value}$$

- Direct capitalization formula:

$$\text{Value} = \frac{\text{Next Year's Income (e. g., NOI or Cash Flow)}}{(\text{Overall Capitalization Rate})}$$

- Terminal Period is a stable growth period

# Derivation of Overall Capitalization Rates

- **Capitalization Rates in Real Estate**
  - Comparable Sales
  - Band of Investment Method
  - Debt Coverage Analysis
  - Analysis of Yield Capitalization
  - Surveys
- **Capitalization Rates in Unit Valuation**
  - Extracted from Market Data
  - Yield Cap – Long Term Growth Rate formula

# Direct Capitalization Method

$$\text{Value} = \frac{\text{Next Year's Income (e.g., NOI or Cash Flow)}}{(\text{Cost of Capital} - \text{Selected LT Growth Rate})}$$

- Often used when explicit forecasts of net cash flows are not available or when income is expected to increase or decrease at a constant growth rate
- Used when developing terminal value in discounted cash flow analysis
- Sometimes Called: Stable Growth Yield Capitalization, Gordon Growth Model, Direct Capitalization, etc.

# Direct Capitalization Example

Hypothetical assessment as of January 1, 2015:

	<u>2014</u>	<u>2013</u>	<u>2012</u>
Net Operating Income	20,000	18,000	17,000
Weighting	<u>50%</u>	<u>35%</u>	<u>15%</u>
Weighted NOI	10,000	6,300	2,550
Weighted Average NOI	18,851		
Direct Capitalization Rate	<u>8%</u>		
Indicated Value, Rounded	<u>235,600</u>		

# Who This Topic Is Important To

- This topic is relevant for all unit valuations
- This is also important outside of the property tax arena: gift and estate tax, family law, dissenting shareholder rights cases, transactions, etc.
- Significant body of relevant research exists outside of the property tax arena: court decisions, journal articles, academic studies
  - We may present information and examples from all disciplines to highlight the importance of this topic and present the most current and relevant opinions on the topic

# Why This Topic Is Important

- The concluded value in the income approach is sensitive to the long-term growth rate
- Analysts often spend a disproportionately low amount of time considering this valuation variable relative to other valuation variables in the income approach
- In a dispute, the LTG rate often receives a substantial amount of attention relative to other valuation variables



# Topics Covered (1 – 5)

1. Selected growth rate for a business versus a unit of taxable assets
2. Direct cap method is a perpetuity/constant growth model
3. Growth relates to the (normalized) income that is capitalized (e.g., NOI or net cash flow) in a direct cap method
4. Real versus nominal growth
5. Real estate growth rates

# Topics Covered (6 – 10)

6. Implications of selecting LTG rates that exceed the growth of the U.S. economy
7. What is really meant by *perpetuity*
8. Addressing multiple LTG rates in the terminal period
9. Internal consistency between the selected LTG rate and the other variables in the income approach
10. Using market data and industry data to estimate the LTG rate

# What Is (Isn't) Growing

- Growth relates to the measure of income that is subject to the direct cap or yield cap analysis (i.e., the income that is capitalized)
- Growth does not necessarily relate to revenue, historical growth, or near-term projected growth
- Net income, cash flow, or some other measure?
- One common assumption is that the net cash flows is equal to net operating income (NOI), which assumes that depreciation is equal to capital expenditures.

# Valuation Subject

- The income approach may be used to estimate the value of a total unit, business enterprise, equity interest, intangible asset, real estate, etc.
- Value is related to the income that is discounted or capitalized
- The direct capitalization method is often based on net operating income (NOI), and NOI is often assumed to relate to taxable assets only
- The direct capitalization method is often used to estimate the market value of the unit of taxpayer assets

# Presentation Objectives

- Understand the importance of the selected long-term growth rate in an income approach valuation analysis
- Understand both the qualitative and quantitative factors that should (and should not) be considered when selecting the long-term growth rate
- Learn how to select and support a long-term growth rate
- Learn how to match other income approach projection variables to the selected long-term growth rate

# Terminal Value in Yield Capitalization

## Discrete Period Cash Flow:

Period	1	2	3	4	5
Cash Flow	80	50	70	90	100
Present Value Factor - 15% WACC	<u>0.8696</u>	<u>0.7561</u>	<u>0.6575</u>	<u>0.5718</u>	<u>0.4972</u>
PV of Cash Flow	69.6	37.8	46.0	51.5	49.7

## Terminal Value:

Terminal Period Cash Flow	105	<b>Assumptions:</b>
÷ Direct Capitalization Rate	<u>10%</u>	Weighted Average Cost of Capital (WACC) = 15%
= Terminal Value	1,050	Growth Rate = 5%
× Present Value Factor	<u>0.4972</u>	Capex required in year 2 to achieve growth
= Present Value of Terminal Value	522	

PV of Discrete Period CF	255	(one-third of total)
<b>PV of Terminal Value</b>	<b><u>522</u></b>	<b>(two-thirds of total)</b>
Concluded Unit Value, Rounded	777	

# Income Approach Sensitivity to Variables

- Unit value in prior example was \$777
- Unit value if discrete period cash flow is reduced by 25%: \$713 (8% decrease)
- Unit value if LTG rate is 7%: \$907 (17% increase)
- Unit value if LTG rate is 3%: \$690 (11% decrease)
- Component changes in WACC
  - e.g., selected beta, risk-free rate, equity risk premium
  - 1% increased/decreased in the WACC results in only a 2% to 3% change in the present value of discrete period cash flow

# Value Sensitivity in Direct Capitalization Method

The concluded value is very sensitive to the selected LTG rate

	Terminal Value Based on Alternative Direct Cap Rates				
Terminal Cash Flow	100	100	100	100	100
÷ Direct Capitalization Rate	<u>8%</u>	<u>9%</u>	<u>10%</u>	<u>11%</u>	<u>12%</u>
= Terminal Value	<u>1,250</u>	<u>1,111</u>	<u>1,000</u>	<u>909</u>	<u>833</u>
Difference from 10% Cap. Rate Assumption	+25%	+11%	0%	-9%	-17%



# Capitalized Income Should Be Normalized

- May be based on 5-year average, 3-year average, LTM, projected next year, historical weighted average, or some other measure
- Exclude income that is not expected to recur
  - Net operating loss carryforward
  - Line of business that no longer exists
  - Income from the gain on sales of assets
- Exclude expenses that are not expected to recur
  - Litigation expenses
  - Restructuring expenses

# Growth by Asset Class

- Not all assets increase or decrease at the same rate
- Financial assets (low growth rate)
- Tangible assets (low to moderate growth rate)
- Intangible assets (negative to high growth rate)
- According to the *Intangible Asset Handbook*, “Many companies have anywhere from half to ninety percent or more of their value and capital structure represented by intangible assets.”

# Comparative Building and Equipment Costs

## COMPARATIVE BUILDING AND EQUIPMENT COSTS

SECTION 98 PAGE 3  
January 2015

### NATIONAL AVERAGES OF ALL TYPES OF BUILDINGS AND EQUIPMENT

January 2015



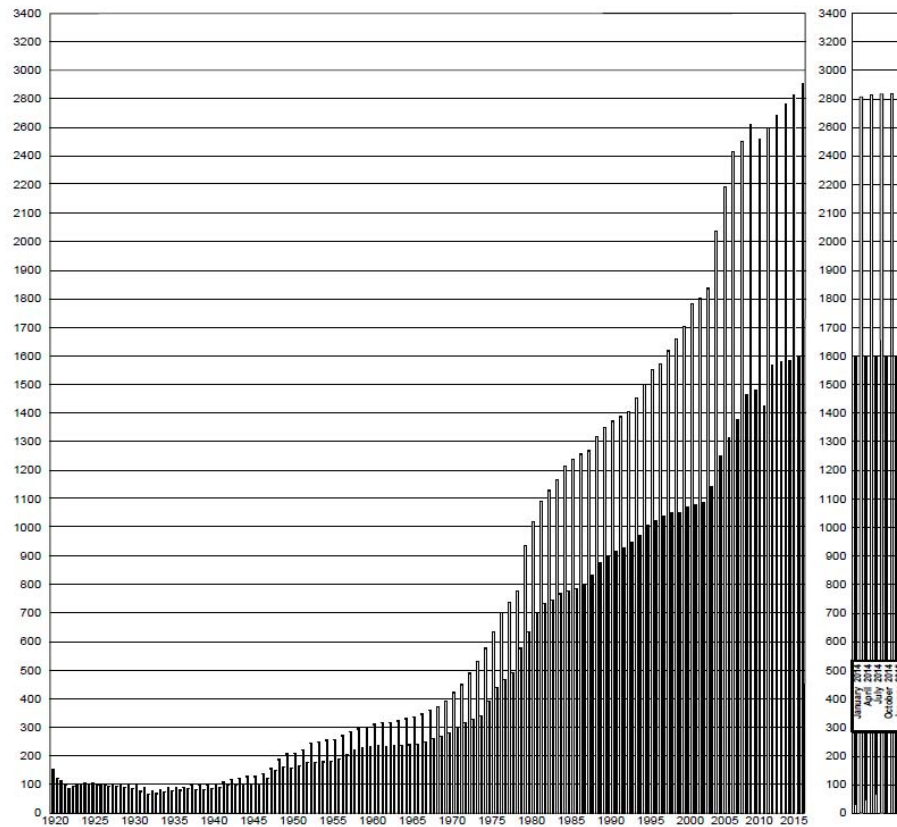
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#### BUILDINGS

The Building Comparative Cost Indexes are based on a weighted national average of all types of buildings from three district indexes. These basic indexes are further divided into five classes of construction from cities and regions throughout the districts.

#### EQUIPMENT

Comparative equipment Cost Indexes are based on a national average for 47 different industries. They represent an estimate of the trends in installed equipment costs from 1914 to date. An individual industry index represents a composite of the entire plant equipment and does not consider machinery or other major items alone.



# Typical Real Property Example

- **Estimates are typically based on existing lease provisions and expected forecasts regarding lease renewals and growth rates applied to other income and operating expenses in the market**
  - **The focus is often on the anticipated performance of the subject property**
  - **Market rents typically expected to increase by CPI, as many leases have such provisions**
  - **Operating expenses are often forecasted to increase 3% annually with some exceptions, unless historic data suggests otherwise**

# Enterprise Value and Unit Value

- Enterprise value ≠ total unit value ≠ value of taxable assets
- Cash flow may be derived from tangible and intangible assets
- Growth may include assets that don't exist on assessment date

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	Centrally Assessed Taxpayer		
	<u>12/31/09</u>	<u>12/31/14</u>	<u>CAGR</u>
Total Enterprise Value	\$5.0 billion	\$14.1 billion	23%
Unlevered Free Cash Flow	\$125 million	\$300 million	19%
Total Assets	\$5.2 billion	\$6.6 billion	5%
Gross Fixed Assets	\$6.0 billion	\$7.3 billion	4%

CAGR = Compound annual growth rate

# The Acorn or the Oak Tree



Day 0

After 200 to 300 years





# Exit Multiples in Income Approach

- Use of exit multiples results in a market approach (or at best a hybrid income/market approach)
- Analysts cannot avoid estimating growth by using exit multiples in the terminal value
- A capitalization rate is an inverse of a pricing multiple
  - i.e., a 20x P/E multiple = 5% direct capitalization rate
- Pricing multiples are based on the same factors that are considered in the direct cap rate, including risk & growth
- These same issues affect the pricing multiple selection in the market approach

# P/E Multiples Example

- Many cap rate studies calculate direct capitalization rates as the inverse of P/E multiples
  - Example: The Minnesota 2015 cap rate study calculates the median Class I Railroad P/E Ratio at 20.0x and the direct cap. rate at 5.0%
- Those P/E ratios include assumptions about risk and growth

Variable	Canadian National Railway Co.	Canadian Pacific Railway Ltd.	CSX Corp.	Norfolk Southern Corp.	Union Pacific Corp.	Average
Trailing P/E Multiple	20.0x	23.8x	18.0x	16.9x	20.3x	19.8x
Implied Direct Cap Rate for NI	5.0%	4.2%	5.6%	5.9%	4.9%	5.1%
Company Cost of Equity per Bloomberg	13.9%	16.1%	10.1%	10.5%	10.3%	12.1%
Implied LTG Rate	8.9%	11.9%	4.5%	4.6%	5.4%	7.1%



# Security Analysts' Growth Rates

- Represents net income growth over the next 3 to 5 years
- Projections include growth from intangible assets and assets not in existence as of the valuation date

<u>Class I Railroads in MN Cap Rate Study</u>	<u>Analysts LTG</u>	<u>No. of Estimates</u>
Canadian National Railway Company	10.6%	1
Canadian Pacific Railway Limited	16.3%	1
CSX Corp.	7.8%	3
Norfolk Southern Corporation	8.9%	2
Union Pacific Corporation	10.8%	3
<b>Average</b>	<b>10.9%</b>	

- For railroads, real growth may come from new locomotives, freight cars, and containers; increased mainline capacity; construction of new facilities; and other similar factors

# Academic Study of Analysts' Growth Rates

- **Results of a study of 2,900 publicly traded companies:<sup>1</sup>**
  - Analysts are actively selecting company-specific growth rates
  - Actual median real growth rate (3.5%) corresponds closely to real GDP growth (3.4%)
  - The past is a poor predictor of the future
  - Analysts are overly optimistic
  - Informative only over short time horizons
  - Stock valuations do not accurately correspond to future growth
  - Absence of predictability

<sup>1</sup> = "The Level and Persistence of Growth Rates," by Lous K.C. Chan, Jason Karceski, and Josef Lakonishok, *Journal of Finance*, Vol. LVIII, No. 2, April 2003.

# Use of Real Growth Rate vs. Nominal Growth Rate

- **Nominal values = Includes the impact of inflation and the real return**
- **Real values = Values that have been adjusted for the effects of inflation**
- **Ibbotson SBBI Valuation Yearbook: “An example of an indefinitely sustainable growth rate is the expected long-run growth rate of the economy.”**
- **Minnesota 2015 Cap Rate Study: “Based on the above [projected real GDP] sources, the indicated long-term growth rate of the United States economy is 2.3%.”**

# Quotes from Court Cases

- “Generally, once an industry has matured, a company will grow at a steady rate that is roughly equal to the rate of nominal GDP growth.” *Global GT v. Golden Telecom*
- “The rate of inflation is the floor for a terminal value estimate for a solidly profitable company that does not have an identifiable risk of insolvency.” *Global GT v. Golden Telecom*
- “There also is considerable precedent in Delaware for adopting a terminal growth rate that is a premium, such as 100 basis points, over inflation.” *Nathan Owen v. Energy Services, Inc.*

# Livingston Survey 10-Year Forecast

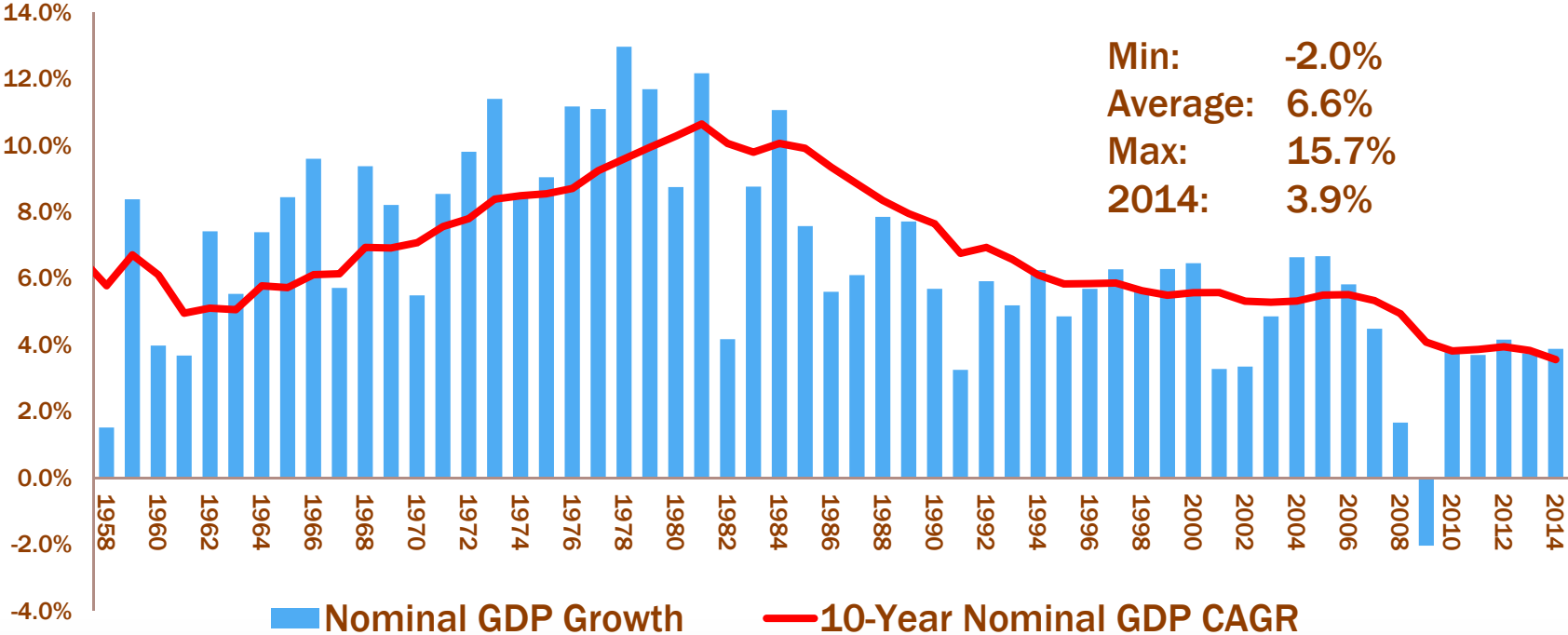
- **Projected compound annual growth rates, next 10 years, according to the June 2015 Livingston Survey:**
  - Inflation: **2.2%**
  - Real GDP growth: **2.5%**
  - Nominal GDP growth: **4.8%**
  - Nominal GDP growth calculation:  
 $((1.022) \times (1.025)) - 1$

## Historical Livingston Survey Projections

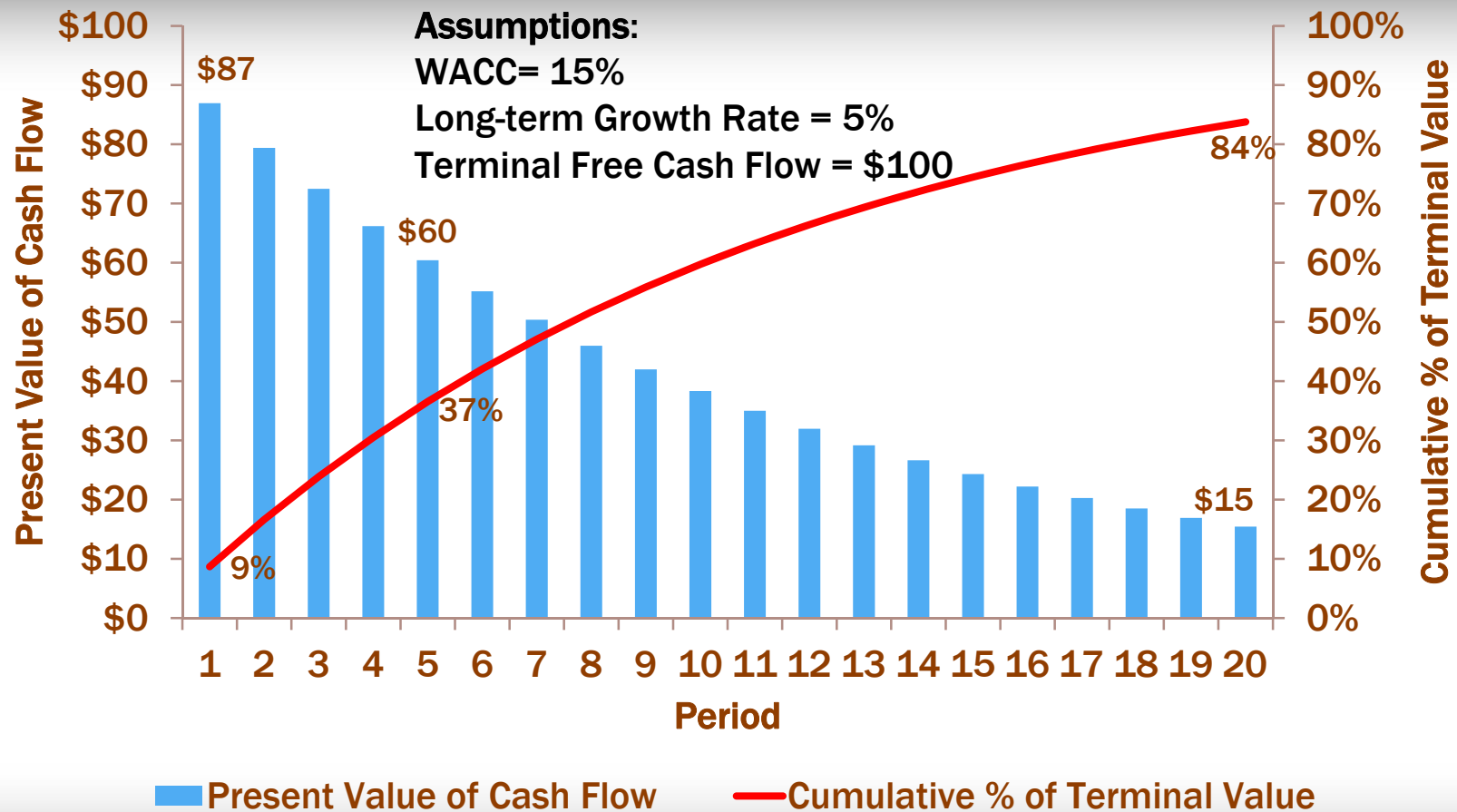
Date	Real GDP	Inflation	Nominal GDP
<b>Jun-15</b>	<b>2.5</b>	<b>2.2</b>	<b>4.8</b>
Jun-14	2.5	2.4	4.9
Jun-13	2.6	2.5	5.2
Jun-12	2.7	2.4	5.2
Jun-11	2.7	2.4	5.2
Jun-10	2.9	2.5	5.5
Jun-09	2.7	2.4	5.2
Jun-08	2.8	2.5	5.4
Jun-07	3.0	2.4	5.5
Jun-06	3.2	2.4	5.7
Jun-05	3.3	2.5	5.9

# Historical Economic Growth

## Nominal Annual GDP Growth and 10-Year Nominal GDP Compound Annual Growth Rate



# PV of Cash Flow in Terminal Years 1 through 20



# Company Growth Exceeding the Growth of the U.S. Economy

- **NYU Finance Professor Aswath Damodaran writes:**

“Since no firm can grow forever at a rate greater than economy in which it operates, the constant growth rate cannot be greater than the overall growth rate of the economy.”

- **In Merion Capital v. 3M Cogent, the Court said:**

But, a terminal growth rate should not be greater than the nominal growth rate for the United States economy, because “[i]f a company is assumed to grow at a higher rate indefinitely, its cash flow would eventually exceed America's [gross national product].”



# Fast Growth Example

- Even after 100 years of growth (8.0%) that exceeds the U.S. economy (6.6%), a \$100 million dollar company is still insignificant relative to the U.S. Gross National Product

	Value (\$Billions)	Growth Rate	Value after X Number of Years			
			5	25	50	100
Company A	0.100	8%	0.147	0.685	4.7	220
Company A	0.100	20%	0.249	9.540	910.0	8,281,797
U.S. GNP	17,848	6.6%	24,568	88,210	435,963	10,649,029

- U.S. GNP will equal \$10.6 quadrillion after 100 years of 6.6% annual growth

# Two-Stage Growth Model

- H-Model is a two-stage growth model where the growth rate in the initial “extraordinary growth” phase declines linearly until the second “stable growth” phase is reached
- There is also a three-stage model
- Multi-stage models require several more assumptions than a single period model and they assume a linear transition and constant reinvestment/payout ratio
- Not commonly used, but acceptable

# H-Model Formula

Stable Growth Value + Extraordinary Growth Value

$$\frac{CF_0 \times (1+g_s)}{k - g_s} + \frac{CF_0 \times h \times (g_i - g_s)}{k - g_s}$$

Where:

$CF_0$  = Cash Flow (Initial Cash Flow)

$k$  = Discount Rate

$h$  = Midpoint of high growth (transition period  $\div$  2)

$g_i$  = Growth rate in the "initial high growth period"

$g_s$  = Growth rate in the "stable period"

# Terminal Value in Direct Capitalization Method, Revised

- Direct capitalization method example from previous slide:

	Terminal Value Based on Alternative Direct Cap Rates				
Terminal Cash Flow	100	100	100	100	100
Direct Capitalization Rate	<u>8%</u>	<u>9%</u>	<u>10%</u>	<u>11%</u>	<u>12%</u>
Terminal Value	<u>1,250</u>	<u>1,111</u>	<u>1,000</u>	<u>909</u>	<u>833</u>
Difference from 10% Cap Rate Assumption	+25%	+11%	0%	-9%	-17%

- Is this a nonsensical table?

# Consideration of Reinvestment

- **Method #1: Capital expenditures = depreciation expense**
  - Accepted by many courts & widely used in practice
  - Over long enough time horizon, depreciation expense and capital expenditures will be equal
- **Method #2: Capital expenditures > depreciation expense**
  - May be appropriate if the selected LTG rate > inflation
  - Plowback ratio: Reinvested CF required to achieve growth
  - Theory: If real growth exists, the plowback ratio > 0%
  - Theory: If the plowback ratio > 0%, then capex > depr.

# Assuming Capex Exceeds Depreciation in Terminal Period

- Formulas:  $g = k * r$  and  $k = g \div r$

$g$  = *real* growth rate in net cash flow

$k$  = plowback ratio

$r$  = return on investment

- May be 4% to 5% greater than required return (Damodaran)
- In one 2015 court case, both experts incorporated reinvestment in their terminal value (i.e., capex > depreciation), and the premium to the WACC was around 10% for each expert

# Revised Terminal Value Example

## Terminal Values Based on Previous Slide

Terminal Cash Flow	100	100	100	100	100
Direct Capitalization Rate	<u>8%</u>	<u>9%</u>	<u>10%</u>	<u>11%</u>	<u>12%</u>
Terminal Value	<u>1,250</u>	<u>1,111</u>	<u>1,000</u>	<u>909</u>	<u>833</u>

## Terminal Values Considering Reinvestment

Unadjusted Terminal Cash Flow	100	100	100	100	100
Estimated Real Growth Rate	<u>4%</u>	<u>3%</u>	<u>2%</u>	<u>1%</u>	<u>0%</u>
Calculated Plowback Ratio	21%	16%	11%	5%	0%
Adjusted Terminal Cash Flow	78.9	84.2	89.5	94.7	100.0
Direct Capitalization Rate	<u>8%</u>	<u>9%</u>	<u>10%</u>	<u>11%</u>	<u>12%</u>
Terminal Value	<u>986</u>	<u>936</u>	<u>895</u>	<u>861</u>	<u>833</u>

# Specific Source of Growth

- **Industry Growth**
- **Economy Growth**
- **Company-Specific Factors**
  - **Increasing Prices**
  - **New Products**
  - **Acquisitions & Joint Ventures**



# Growth from Industry Factors

- An industry analysis is important for selecting the LTG rate
- Industry-specific trade organizations often publish data
- Independent 3<sup>rd</sup> parties publish industry growth rates—e.g., IBISWorld, First Research, and S&P Capital IQ publish periodic industry profiles for a variety of sectors.

# Industry Analysis Example

	Wireless Telecom	Wired Telecom
IBISWorld	“Revenue is projected to grow at an average annual rate of 3.3% over the next five years”	“Revenue is forecast to decline 0.8% per year on average in the next five years to 2019.”
First Research	“Output . . . is forecast to grow at an annual compounded rate of 7 percent between 2014 and 2018.”	“Revenue . . . Is forecast to grow at an annual compounded rate of 0 percent between 2015 and 2019.”
S&P Capital IQ	“Fundamental outlook for the wireless telecommunications sector was neutral. . . Wireless telecom will continue to be viewed as the growth arm of the telecom industry.”	“Fundamental outlook for the wireline sub-industry for the next 12 months was neutral. . . revenue pressure to remain.”

# Global GT v. Golden Telecom

- **The Court considered:**
  - Russia projected inflation
  - Russia projected real GDP growth
  - Historical U.S. growth of telecom industry relative to U.S. economy
  - Stage of telecom industry in Russia
- **The Point: The court considered growth in the overall economy *and* projected industry growth**

# Growth from Economic Factors

- Consider both real and nominal economic growth and if the subject company is expected to grow faster, slower, or similar to the growth of the U.S. economy
- Understand which economic factors affect the company outlook, and find projections for those factors
  - Airlines are affected by consumer confidence; consumers are more likely to travel by air for vacation when consumer confidence is high. The Consumer Confidence Index equaled 92.6 in December. A figure between 80.0 and 100.0 suggests slow growth (Consumer Confidence Index figures can range from 0 to 160)

# Company-Specific Factors

- Understand the story
- It may not be appropriate to use the same LTG rate for all companies in an industry
- Growth can come from
  - existing assets, both tangible & intangible
  - new products or services
  - acquisitions & JVs

# Key Points

- You don't have to adopt any of this
- However, you should think about these factors and understand if/how they affect the unit valuation

**The End**

**Questions and  
Discussion**