What is good appraisal?

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- We desperately need well-trained valuation experts for the real estate market to function efficiently.
- Good appraisal is not justification of a purchase price for the purpose of financing.
- Good appraisal is not a report with so many limiting conditions and qualifications as to make it useless for understanding risk.
- Good appraisal serves the needs of the client and the type of value they seek.
- Good appraisal will use the best data possible and all relevant methods, but often we will rely more on one method or two and we should not fudge methods where there is insufficient data, merely to provide three or more traditional methods.
- In summary, good appraisal is a value estimate based on as complete an information set as is reasonable relative to the fee or required for the purposes of the value estimate.

Appraisal Methods Evolve

The Roots of Valuation: Appraisal Methodology is Not Static

- Until recently, public data was kept in county records on physical paper and not in on-line accessible files. Computers and electronic calculators did not exist widely until the late 1980s and early 1990s. As such, real estate records and information was valuable, expensive to collect, and labor intensive to analyze or present.
- 1893 Richard Ely wrote “Outlines of Land Economics” and established the first academic program in the US at the University of Wisconsin in 1920. From 1903 through 1960 names like Hurd, E. Fisher, Babcock, Hoyt, Weimer, Ratcliff, Wendt, Ellwood and others kept writing books suggesting methods to value real estate.
- Hurd talked about longer term “intrinsic” value and “exchange” value that could vary with buyer or seller circumstances.
- Babcock suggested several types of values might exist, liquidation value, assemblage value, insurable value, normal sale value, loan security or collateral value.
- Weimer and Hoyt proposed various income methods and capitalization techniques.
- We have morphed from one to several and then to three traditional appraisal methods and now are evolving further to five, six or seven.

Two dominant valuation trade associations

- RICS suggests three prominent methods of appraisal, not all to be used on all valuation.
  - Residual Site value
  - Market Approach
  - Discounted Cash Flow Valuation
- The Appraisal Institute suggests:
  - Market Approach
  - Income Approach
    - Income Capitalization
    - Discounted Cash Flow
  - Cost Approach
    - Replacement or reproduction cost approaches

Data: The Lifeblood of Appraisal

- Prior to 1980 most of the time spent on appraisal was spent gathering sparse and costly data.
- Today CoStar, MSCI, REIS, Realpage, RealNex, Compstak, CoreLogic, Black Knight, Attom Data, IPD and a host of other vendors provide near real time data collected from a variety of sources, property tax offices, MLS, and others.
- Data is now ubiquitously available, thus more filtering and analysis is possible and much more statistically intensive valuation methods are possible.
- We can also use data never available or used before, such as list prices or time to sell or sublease rates, all of which provide more insights on market conditions and trends.

Computing Power

- Until the 1980s any kind of filtering or math from averages to trends to variance to correlation required labor intensive slow calculations.
- Discounted cash flow analysis required several hours, even once you had collected all the relevant data.
- Today we have the ability to process millions of data points in seconds.
- Add in geographic information systems and we can visualize in maps any kind of patterns or trends that previously only local analysts would be able to pick up on.

Today we can add the following data intensive methods:

- Automated Valuation Methods
  - Hedonic (regression) techniques
  - Grid appraisal emulation of the market approach to value
  - Machine Learning Models like XG Boost or LSTM

- Time Adjusted Price Update
  - Use an index to update a previous sale price to the date of the appraisal

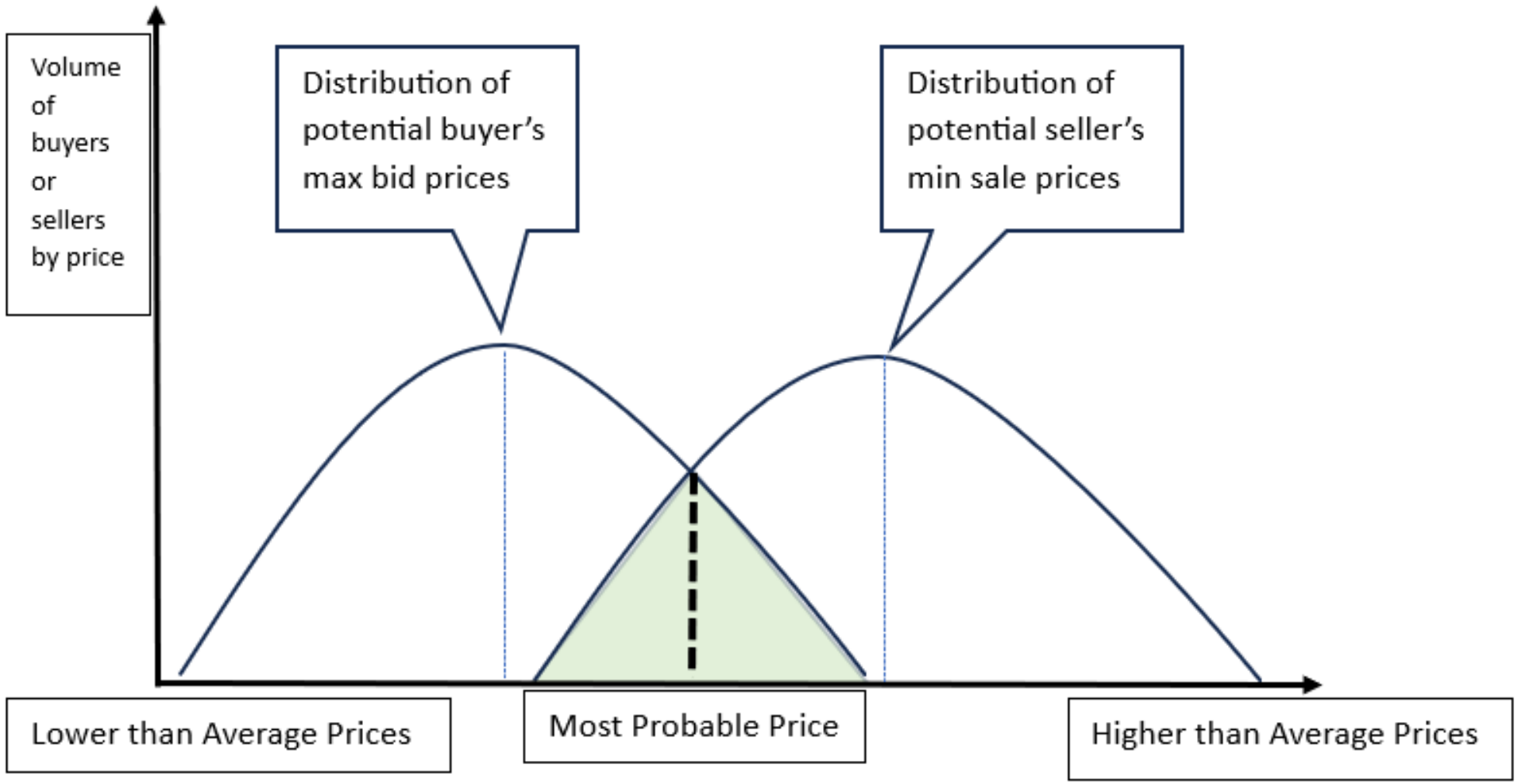
The Formation of Price and Value

- Price: asking price, list price, selling price all facts
- Value: liquidation value, market value, investment value, insurable value all theoretical and defined

Some critical market economics

- There is a distribution of potential buyers and sellers for most anything.
- Real estate need not be identical to compete. It merely needs to be a substitute.
- We have over lapping submarkets of competing properties, that might be defined by location, features, condition or quality and size.
- There will be common drivers of value to most buyers or sellers, but some that are unique to the buyer or seller.
- Common drivers should drive the most likely price. These can be thought of as endogenous factors, inherent within the property and location (size, condition, design, location, features).
- We also have exogenous factors that drive prices that individual buyers or entities are willing to pay or receive that create a dispersion of possible prices, even at the same point in time.

Market Value is Statistically Most Probable Price



Some definitions

- Reservation price: Value to an individual or entity, maximum a buyer would pay, minimum a seller would accept. These differ for all buyers and sellers.

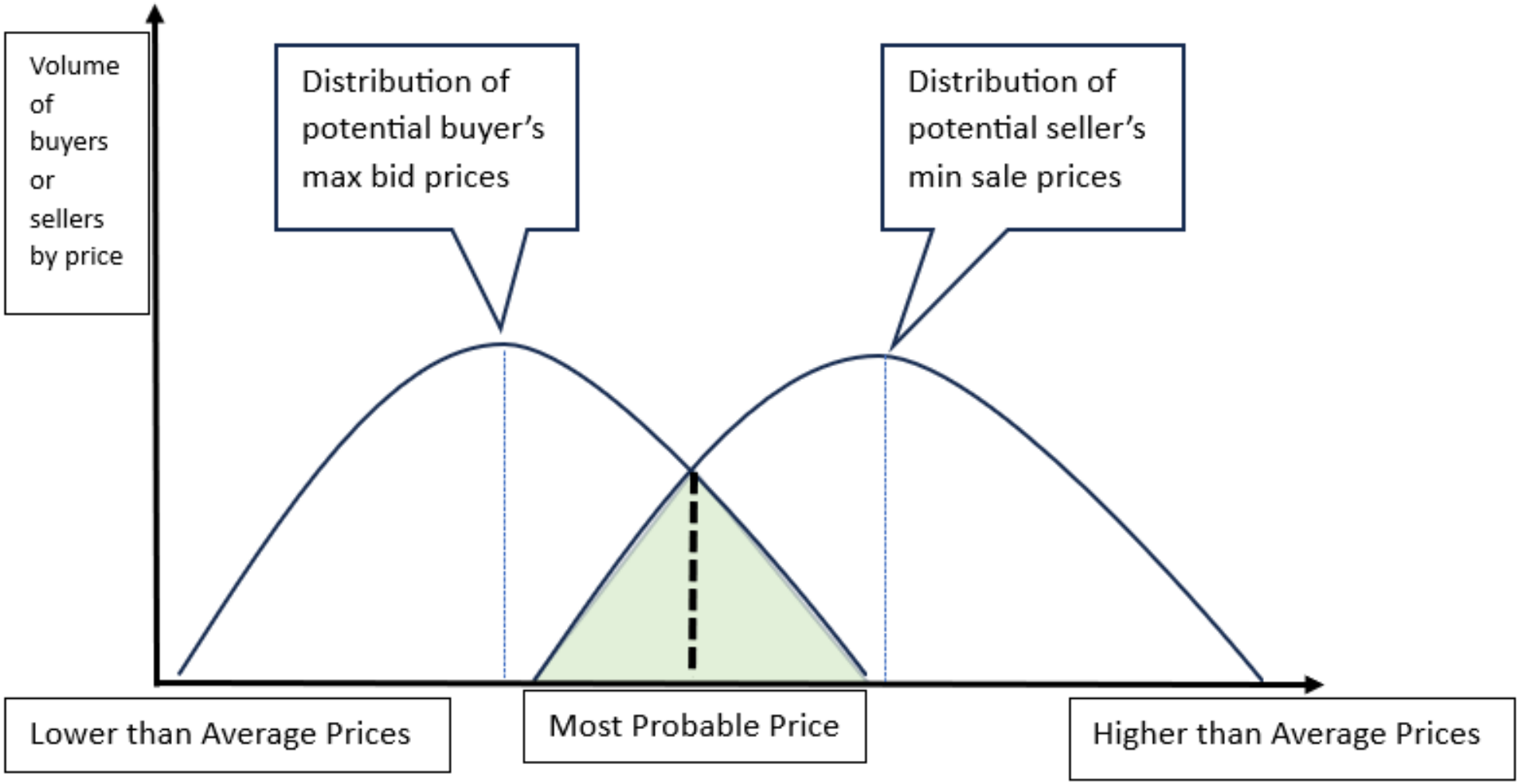
- Fair market value: "Market value means the most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus."

- Market value: Statistically most probable price, and without assuming we know anything about individual buyers or sellers behind the transactions used as data. A safer definition for valuers.

Why do we have price dispersion?

- Only in a perfective competitive market would we have a single price at any point in time.
  - There must be many buyers and sellers,
  - Each without any unique ability to influence the price,
  - The buyers, and sellers all have similar and full information (not “perfect information” as some texts suggest as this never exists), and
  - There are no barriers (costs) to entry or exit from the market.
- Real estate is a market of high information costs, differences in tastes and preferences, different expectations about the future, and unique circumstances for buyers and sellers.

Do people overpay or underpay? Is it rational?



What else could affect price aside from location, size, quality, features and condition?

1. Fee Simple versus Quitclaim deed
2. Non-arms-length transaction
3. “As is” sale versus material fact disclosure and liability for omissions
4. Seller financing below market
5. FFE included
6. Assemblage with am adjacent parcel
7. Grandfathered zoning use
8. Seller paid closing costs
9. Recently enacted buyer tax credits
10. Seasonality and seller or buyer anchoring
11. And more that we may not always pick up in the data including the need to buy or sell, and that loud pit bull living next door.

More definitions and review

- Price
- Value
- Subject property
- Comparable sales or “comps”
- Intrinsic value
- Use Value
- Market equilibrium
- Highest and Best Use: physically possible, legal, financially feasible, maximally productive.
- Most Probable Use
- Most Probable Price

And More Definitions that will be useful

- Investment Value (Reservation price)
- Liquidation Value
- Time Targeted Pricing
- Replacement Cost
- Reproduction Costs

Summary

- Real estate values are actually ranges with varying degrees of confidence.
- Seldom do we know all the details behind contracts that may have influenced a sales price such as FFE or seller incentives or credits for repairs or a buyer offering a speedy no contingency closing.
- Not only should we estimate value, but we should provide a range or confidence range to suggest how certain we are in a given value.

Overview of Modern Valuation Methods: Three traditional plus two more now in practice

1) Market or Sales “grid” comparison approaches
2) Cost approaches
3) Income approaches
4) Regression methods and appraisal grid emulation
5) Time adjusted value method

Note RICS also has “new development valuation” or residual methods which AI might consider a hybrid method using market, income and possibly cost assumptions in the method.

Remember to start with the purpose of the valuation

- Define the value you seek
  - Investment value to an individual or entity
  - Market value for financing collateral
  - Liquidation value or time targeted pricing
- Assess the data available and required, then apply the methods to be used.

Sales comparison approach

- Define your submarket
- Generate a potential list of comparables or comps and score them for similarity with the subject property
- How many comps?
- For the most similar comps (3 or more) adjust their selling price to answer the question: What would they sell for if similar to the subject property?
- Adjust for time, size, features, location
- Try and minimize the dispersion of final adjusted prices among all comps. Consider discarding comps that are extremes.
- Weight the final adjusted comps indications of value.

Cost Approach

- Almost never valid or appropriate.
- Reproduction cost should only be used on historic or unique property, where materials and craftmanship matter.
- Replacement cost replaces the function of the building.
  - Simple methods using cost index guides per square foot or meter based on construction materials and adding in extra costs for special features (roof or Sprinkler systems that are not typical for example) to get cost new.
  - Advanced methods require construction company estimates to get cost new.
- Knock off value based on the effective age of the building as a percentage of the total economic life.
- Add together depreciated building and land valued at Highest and Best Use using land sales comps if available or based on proxies such as the assessment break down.

As part of the cost approach or when we try and value a site for development, keep in mind:

Total property value = current use value + option value from conversion to other more productive uses

Most of the time the option value is zero since the cost to convert to other uses does not create enough value to be worthwhile.

Sometimes for older properties, obsolete properties, surface parking lots, vacant land or agricultural land there will be alternative uses that drive value.

For the most productive uses we need to find similar land comps if possible, or use a residual approach.

Land is valued using comps

- Prices paid for empty land or nearby land is ideal but rare.
- Using sales where buildings were torn down helps, if we can get the costs of demolition and add to the land of the site if empty, again using units of comparison such as price per square foot or square meter.
- If all else fails, consider the ratio of land to building in assessment records and use this to carve out land from a total sale price.
- Don’t forget to adjust useable site for topography and land use set back requirements (buffer requirements, steep slopes, sidewalks required)

What is the economic life of a building? It's a guess.

• Residential	80	Both single family and multifamily can last a long-time if maintained.
Industrial Warehouse	30	Technology changes how wares houses are designed and used
• Manufacturing	20	Technology changes very quickly for manufacturing.
• Retail Strip Center	40	These are simple structures, so they last longer.
• Retail Mall	20	Malls require major overhauls more often.
• Hotel	25	Hotels require heavy maintenance and repair.
• Self-Storage Centers	40	These simple structures should last a long time.
• Data Centers	15	Technology will require major overhauls.
• Schools	30	While these are used for many decades, technology suggest they will need to adapt more quickly in the future.

What is the effective age of a building?

- Actual age or compared to others.
- It’s a guess!

- We take the effective age/economic life and multiply by cost new and subtract from the building value to get net building value.

Sum it up

- Cost new of the building
- Less building depreciation
- Plus land value (using comps)
- Equals value via the cost approach

Income Approach to Value

- After defining the value sought, start with collecting data on the subject property and the comps that compete with the subject property, rents, lease information, vacancy, lease up time, tenant quality, market conditions and market rents, sublease activity and lease rates, operating expenses and financing terms available in the market.
- Work up a proforma on the subject property, that is cash flow projection through at least the net operating income for several years.
- Consider a capitalization approach based on the relationship between going in cap rates and value on comps.

Item to Calculate	How?	Comment
Potential Gross Income, PGI	This is the sum of what is possible to collect as rent, if the building were fully, 100% occupied, based on all useable areas.	If the building has leases in place, we would start with the contract rents and add them up. If it does not have leases, we would use the typical rents of peer property, after a reasonable absorption period for such property.
Less Vacancy and Collection losses	We would start with the typical vacancy among competing properties in the market. We might use something lower or higher, if we feel the property is more or less competitive.	Lenders always insist on some vacancy, even if the property is 100% leased.
Add other income	There may be other income such as laundry rent, parking fees, percentage rents on retail leases, and all these other sources of income would be added.	For residential, the two typical items are laundry and parking fees, but there may also be bike and storage locker fees or others. For commercial property, we may also see participation in sales (percentage rents).
Effective Gross Income, EGI	This is what the owner expects to collect each period, noting that each of these has a trend.	When using the simplest discounting method, we want to use a fully stabilized rent and net operating income estimate, based on a reasonable lease up period.
Subtract Operating Expenses	When not paid by the tenant, this could include utilities, property taxes, property insurance, on site management, asset management, security, landscaping, maintenance and repairs and anything else required to keep the property leased and operating.	For commercial property, many of these items are passed through to the tenant. For residential it is unusual to pass these through, except for utilities that the tenant may pay directly (electric, gas, water and sewer, cable fees, internet fees, phone service) depending on the terms of the lease.
Equals Net Operating Income, NOI	This is what is available to the owner and lender who provide the capital to buy the property.	Each year we will have an NOI estimate.

We want to have an estimate of NOI for several years

Year 1	2	3	4	5	6	7	8	9	10	11
NOI_1	NOI_2	NOI_3	NOI_4	NOI_5	NOI_6	NOI_7	NOI_8	NOI_9	NOI_{10}	NOI_{11}

Note that we might expect a ten-year holding period and thus want to estimate NOI out for a year beyond the holding period.

For each year we need to estimate the growth in rents, likely vacancy rate and the trends in each of the operating expenses if paid by the landlord. I.e. property taxes, property insurance, utilities, maintenance and repairs, reserves for replacement, etc.

Using the formula of V = NOI/R

- Value = NOI/R where NOI is the stabilized forward looking (next year NOI) and R is the capitalization rate based on prices paid for comps.
- To derive a market R we use R = NOI/Price for similar property
- We need several comps to get a good estimate of R and if financing trends or yields have changed, we need to adjust R. Typically R is a spread above treasury rates or longer term risk free rates and this spread can be added to current treasury rates.
- There are many other ways to generate cap rates but this goes beyond an introduction to the method. Keep in mind one trade off, that total returns are a function of going in current returns and upside returns from the growth of NOI, if any.

We can use these general relationships where RRR is the required rate of return and GR is the growth rate

V = NOI/(RRR-GR) and in this case RRR-GR = R the cap rate

We can also use this relationship to rewrite R = RRR-GR as follows:

If we know R from the market and we know the required rate of return, RRR, we can estimate what the market thinks about the growth rate:

- **GR = RRR-R** and we can estimate the RRR if we know the R and have an estimate on the growth rate of NOI, as follows:
- **RRR = R+GR**
- These relationships are very useful to calculate, since it is often hard to know what the market requires as a rate of return or assumes in terms of growth rates. We may want to use the RRR in a discounted cash flow analysis as another approach at income valuation.
- The best way to think about our formula above **V = NOI/R** is to think of it like a market-based multiplier of income. In the stock market, there is much emphasis on the price earnings multiple.

- Stock value = Earnings x PE Ratio or the PE Ratio = Stock Price/Earnings Except the Cap Rate is like an inverse of the PE Ratio more like a net operating income multiplier based on 1/R

DCF Valuation

Theory: Total Market Value = Present Value of Equity + Supportable Mortgage Using Market Terms

- PV_e below is the present value of the equity. Rrr is the required rate of return, T is the number of years of compounding used until the CF is received, and the projected resale cash flow is based upon the net selling price expected after all selling costs and mortgage payoff.

- $$\text{Equity Value} = PV_e = \frac{CF_1}{1 + Rrr} + \frac{CF_2}{(1 + Rrr)^2} + \ldots + \frac{CF_T}{(1 + Rrr)^T} + \frac{\text{Projected Resale } CF_T}{(1 + Rrr)^T}$$

- The cash flow comes from the NOI each year less debt service based on using the typical financing terms available at the time.
- The projected resale value comes from the net price expected based on next years NOI divided by the going out cap rate, usually about 50 basis points higher than the going in cap rate based on it being an older property and assuming no change in interest rates.
- Using the right RRR is critical and often investors suggest aspirational RRR instead of practical RRR.

Regression as a valuation approach

- Hedonic pricing models, aka regression models, capture the relationship between independent variables and a dependent variable, in this case selling price. The relationships can be linear or non-linear but for now, we will use a linear example.
- Sales Price = **a** + B1(X1) + B2(X2) + B3(X3) + Bn(Xn) + residual error
- Here a is an intercept, sometimes used to capture all omitted variables, B is a regression coefficient or the average change in the Sales Price as a function of the variable X. The X's are variables like square feet of useable space or age or an index of property condition or various features like parking garage spaces. Often this model will be run in log form to generate regression coefficients that are % changes in the sales price. Specific models are beyond the scope of what we can cover here, but a good model can result in explaining 80, 90 or 95% of the variation in selling price and thus be a good valuation model.
- One must be careful not to interpret each coefficient too literally, in that we will have multicollinearity among the independent variables. We may also have important omitted variables and that will create more error in the model accuracy. We will need much larger samples to run such models with accuracy. Thirty observations for each variable used in the model would be considered the very minimum. Hundreds are better but require going back further in time or using a larger geographic market for the selection of peer comps.

Sales comp appraisal emulation

- When using a grid to adjust comparable sales towards the subject property we can use the regression coefficients derived separately but we must then use a grid with the same and all of the same variables. The non-weighted average result here is $4.212 million, but we are allowed to and likely would put more weight on comps with the least difference from the subject property.

Subject	Comp 1	Comp 2	Comp 3	Comp 4
Selling Price	$ 3,550,000	$ 4,200,000	$ 3,780,000	$ 3,987,000
Adjustment for Time	10%	1%	3%	0.05%
Adjustment for Size Difference	4%	-2%	4%	10%
Adjustment for Property Condition	6%	2%	3%	-5%
Adjusted Price	$ 4,260,000	$ 4,242,000	$ 4,158,000	$ 4,188,344

Time adjusted Value

- **Market Value = Prior Sales Price of Subject x Index of Price Change Since the Last Sale**
- The whole of the method here is to generate a good sales price index, typically based on the price change per square foot or per square meter for similar property from the time of the original sale.
- The assumption is that any capital improvements affecting the index are typical of the subject property. If the time period is short since the last sale, this method can be result in a very accurate value. Say the index for this property type in this market has increased 9.5% in five years. Such indices are also calculated with repeat sales but this requires much more data. See MSCI or CoStar or Case Shiller for such methodology.
- Market Value = $10.76 million $_{2020}$ times 1.095 = $11.78 million value today

Residual Methods

- With residual methods we want to isolate on either the land value or the building value. Perhaps the land is leased, and the lease depends on the value of the land separately estimated.
- We start with a total property value using V=NOI/R then subtract the value of the building (or land) based on a depreciated value estimate of the building.
- We might start with the value of a new project as proposed with assumptions about lease up and market rents and we subtract the cost new of the building (with developer's normal profit) and what is left is the maximum value of the site. This is a typical land residual technique application.

Appraisal Error and Bias

- Intentional bias: Pick comps that are better or worse with few adjustments.
- Intentional bias: Ignore changes in market conditions
- Unintended bias: Noise and omitted variables: things we don’t know.
- Racial bias: Lower valuation among minorities.
- Other biases: Neighborhood bias (redlining)

New risks to consider in future valuation

- Climate risks
- Rent controls
- Other government interventions and regulations

What is good appraisal?

- Well defined value
- Carefully curated and utilized data
- Using all available reliable information
- Using appropriate methods, not necessarily all possible methods
- Disclosing the uncertainty behind the value conclusion