A Basic Primer on Real Estate Development Economics
Jahan Moslehi, GSB '10 (revised by Paul Hayes GSB '20)

Developers create value by constructing a building which is worth more than the ingredients (processing of entitlements, steel, wood, concrete, land, labor, cost of capital, etc.).

Entitlements are the legal rights to construct a building on a property. There are costs associated with securing the entitlements (i.e., hiring land-use lawyers or consultants to work with the local jurisdiction to receive a government-required permit to build).

Although detailed financial models are used to project revenues and costs, developers assess value creation using simple, back-of-the-envelope calculations. The key calculations are summarized below:

- **NOI / TDC = ROC**
    - NOI: Net Operating Income
        - When developers decide if they want to build a building, they analyze the prospective economics. The first step is to estimate NOI once the building is **stabilized**—completely constructed and has achieved full occupancy (tenants in place) less an assumed vacancy rate (typically a market standard assumption).
        - NOI is defined as revenues (rent) less expenses (operating costs, taxes and insurance) and is expressed on an annualized basis
        - NOI is calculated **before** accounting for the cost of financial leverage (principal and interest payments on a mortgage)
    - TDC: Total Development Cost
    - ROC: Return on Cost (the projected annual return). If this were a bond: annual interest payment divided by the par value of the bond.
    - Example:
        - If the total projected development cost (TDC) is $10 million and the projected stabilized NOI is $1 million, the projected return on cost (ROC) is 10% ($1 million / $10 million)
        - In real estate terminology, the developer "**builds to a 10**"

- **Capitalization (Cap) Rate = NOI / Sale Price**
    - The cap rate is the buyer's initial rate of return (annualized) after purchasing a real estate investment property
    - Example (continuing from above):
        - If a property that generates $1 million in NOI sells for $12.5 million, the cap rate is 8%
        - $1 million / $12.5 million = 8% (buyer's annual rate of return)
    - Because this is an algebraic equation, any two variables allow you to solve for the third variable:
        - Example: if a property's NOI is $1 million and the market determines the appropriate cap rate is 8%, then the sale price is $12.5 million

        - $1 million / 8% = $12.5 million
    - How is the cap rate determined?
        - Like all financial investments, the market decides based on its assessment of the risk of a real estate investment relative to other investment alternatives. For example, if an investor can earn a 2% annual rate of return on a 10-year US Treasury Bill, how much higher does the annual rate of return need to be to risk adjust for buying a building that has a 10-year lease in place? Historically, the required rate of return premium for income producing real estate (versus the US 10Y Treasury rate) has averaged ~400 basis points. So, if the US10Y Treasury rate is 2%, the market determined cap rate for real estate would be 6%. Cap rates may vary significantly from building to building based on location, tenant credit worthiness, lease terms, etc.

- **Development Profit and Mark-up**
    - When evaluating the economic merit of developing a project, the developer uses the Total Development Cost (TDC) and the projected sale price of the project once stabilized to calculate the Development Profit.
    - Development Profit = Projected sale price – TDC
        - Example: if a property's estimated NOI is $1 million and the market cap rate is 8%, then the projected sales price is $12.5 million. If the TDC is $10 million, then the Development Profit is $2.5 million ($12.5 million - $10 million)
    - The Development Mark-up is the Development Profit / TDC.
        - Example: $2.5 million / $10 million = 25%
        - Developers generally require a Development Mark-up of at least 20% to justify proceeding with a project.
    - Algebra allows you to arrive at the following relationships:
        - Development Mark-up = ROC / Cap Rate – 1
            - Example using numbers above: (10% / 8%) - 1 = 25%
        - Development Mark-up = Sale Price / Total Cost – 1
            - Example using numbers above: ($12.5 million / $10 million) - 1 = 25%
        - Development Mark-up = (Sale Price – Total Cost) / Total Cost
            - Example using numbers above: ($12.5 million - $10 million) / $10 million = 25%
        - Development Mark-up = Development Profit / Total Cost
            - Example using numbers above: $2.5 million / $10 million = 25%

Algebra illustrates that all four formulas are saying the same thing

In this example, the Development Mark-up is 25%.