Developer's / Residual Method of Appraisal

Note to BUSI 445 Students, RE: Project #3

In Project #3, you are required to determine the offer price for your property under study using the residual or developer's method of appraisal. The following notes are designed to help you with this, offering a review from Chapter 8 of course BUSI 331. If you have taken BUSI 331 since 2002, you have studied this material already, and this is offered for review purposes only. If you have not studied this material before, there are several points which you will likely find helpful for your Project #3 analysis in BUSI 445.

Assumptions you should make in completing Project #3:

1. Assume the equity invested is equal to the land value (you can ignore the cost of financing the land)

2. If your property is to be leased, you can capitalize the income stream by using market capitalization rates. Market capitalization rates can be derived from the published reports from commercial real estate firms.

3. Building costs can be derived from costing manuals from companies such as Marshall and Swift. Appraisal firms in your area or sometimes local libraries will have copies of these costing manuals. Another source of costing data can be obtained by contacting local builders in your area for estimates of construction costs per square foot.

Best wishes for your Project #3.

Review of Developer's / Residual Method of Appraisal

So far, this chapter has described the theory underlying the residual method in great detail, but has not provided any examples which illustrate its practical applications. The method which is often used by real estate developers to determine the value of land is an application of residual method called developer's residual analysis, or the development method of appraisal.

Conceptual Basis

Land is valuable because of the utility it provides people. In its natural unimproved state, land has little value. For example, millions of square miles of land in Northern Canada have virtually no economic value because they are of no economic use. However, the parcels that are demanded for some useful purpose, such as hydroelectric dams or fishing lodges do have value. The problem facing urban land economists and appraisers is how to determine the value of these developable parcels of land.

There are several methods of determining the value of developable land. Perhaps the simplest method is to compare the plot of land to other similar plots which have recently sold, and assume that the plot in question should sell for approximately the same price. For example, if you are valuing an undeveloped recreational property and there are many recent sales of properties which are similar, these sale prices could represent an accurate estimate of value. This is an application of the direct sales comparison approach and can operate very efficiently, as long as there are sales of similar properties for comparison. However, it can be difficult to apply this approach if the property in question is unique or if there are no similar sales. For example, if the property above was very large, or had a unique view, or was in an isolated area, it is possible that no similar properties could be found to compare to, and it would be difficult to find a justifiable value estimate.

This problem of unique parcels of land is particularly relevant for valuing potential commercial developments in urban areas. These properties are often unique in size and attributes, and each alternative use has its own subset of desirable features. Two lots which are in the same neighbourhood and are identical in size may have very different values if one has the attributes required for a shopping centre, while the other is best suited for a warehouse. In these cases, it is often difficult to find sales which are similar enough to the property in question to be able to infer value. The direct sales comparison method cannot be used to value many of these properties.

Rather than examining the sales of other lots to determine the value of a particular piece of land, the development method focuses the appraisal on the property in question. Try to view the situation from the perspective of a potential developer.

If you were planning to buy this piece of land in order to build something and then sell the property for a profit, how much would you be willing to pay for the land? In this sense, the maximum you would pay for this land would be just enough so that the land cost plus the cost of improving the land exactly equals the expected proceeds of selling the property (of course, the cost of improving the property would have to include your required profit as the developer). Your maximum payment for the land is therefore the amount left over after paying all other costs associated with the development. This is the basis of the development method of appraisal; the price of land is determined by what developers of end use products can afford to pay after accounting for all costs of development.

The value of land under this appraisal method is therefore a residual amount resulting from the improvement of land. Any improvement that increases the value of the land's final use increases the land residual. For example, if house prices are increasing, with other costs remaining constant, land prices should rise. Similarly, anything that raises the cost of development lowers the land residual, and lowers the value of land. The cost of construction is therefore directly related to the value of land. Interest rates are also directly related, since financing charges form part of the cost of development.

An underlying assumption of urban land markets is that land should be used for the activity which yields the greatest utility, that is, the use which generates the highest rent. The residual method operates under this assumption as well. For any particular parcel of land, the better suited the improvements, the higher the potential residual should be. The developer who is proposing the project with the highest residual should be able to bid the highest for the land and be able to implement this end use. Thus, the land will be used for the best suited project, with the highest possible utility, meeting the requirement for the land to be in its highest and best use.

Development Process

The calculation of residual values depends on estimates of future revenues, expenses, and risk. The development residual method entails forecasting cash flows into the future, and can involve considerable complexity. The strength of the end use market has a great effect on value. Consumer attitudes, interest rates, and the general state of the economy affect what people will pay, which affects sale prices and filters down to the land residual. A large part of this appraisal process is to assess the trends in end use markets in order to determine the maximum future sale proceeds.

The first step in examining a potential development is to determine what type of end use would be most suitable for the land in question. The developer should examine the site, check the zoning, and try to determine what is the highest and best use. Next, the developer must decide roughly what the improvements will consist of. Conceptual plans should be drawn and estimates made of the saleable space which will be created.

Once the form of improvements has been decided on, with rough estimates of the general size, the value of the property upon completion must be calculated. This value can be found by capitalizing the expected future income stream at the market capitalization rate (income method of appraisal). This amount represents the maximum cash flow which will be received from this project. If the developer purchases the land and undertakes this project, the profit made would depend on how much of this amount is remaining when the project is complete.

The next step is to determine the expenses necessary to develop the land into a new end use. Some examples of these costs include construction, real estate commissions, architect fees, financing charges, and developer's profit. After computing all of these expenses, and subtracting these from the expected income from the property, the remainder is the land residual.

Framework for Development Residual Method

The land residual can be calculated under several different frameworks, but all of these have a similar theme: calculate the income expectations for the developed land, subtract all expenses associated with this development, and the remainder is the land residual. The following is one common framework, with its components explained below.

Development Method Framework

> Gross value upon completion (1)
> – costs of sale (2)
> Net value upon completion
> – hard cost (3)
> – soft cost (4)
> – development financing costs (5)
> – developer's profit (6)
> Residual to land and land financing cost (7)
> – Land financing cost (8)
> Land residual (9)

Gross Value Upon Completion:

This is the forecast for the maximum cash flow that the property will generate when completed. This figure could be as simple as a rough guess at future sale prices, or it could involve complex discounted cash flow analysis. Some terminology used in this type of analysis includes:

- gross buildable area: the total area of the anticipated improvements
- net saleable area: the portion of the gross buildable area which can be sold to generate revenue
- building efficiency: a measure of how much of the gross building area is saleable. The more efficient the building, the closer to 100% of the gross buildable area can be sold.

Some calculations of gross value upon completion include the net saleable area multiplied by an estimate of the value per square foot when sold, or net rentable area multiplied by the estimated rent per square foot (an estimate of future gross potential rent) and capitalized at a market capitalization rate.

Costs of Sale:

Closing costs are expenses required when selling real estate, and include items such as real estate commissions and legal fees. Marketing costs are also often included in costs of sale, as large development projects often require considerable promotional expense to facilitate their sale.

Hard Costs:

Hard costs represent the expenses directly associated with construction. The simplest method to calculate hard costs would be to estimate the expected construction cost per square foot and then apply this figure to the gross buildable area. More complex methods would involve estimating the cost of each component separately (such as the cost per square foot to build the roof, exterior walls, foundation, and so on) or pricing the materials and labour needed for every portion of the planned development.

Soft Costs:

Soft costs are the overhead associated with the development process. Some examples of these include consultant's fees (such as architects and engineers), property taxes during construction, and interim financing costs. Soft costs are often expressed as a percentage of hard costs, although they can be forecasted and itemized in detail if required. In particular, the interim financing costs during construction generally require fairly detailed analysis, and will be dealt below in a separate category.

Development Financing Costs:

Most development projects are undertaken using debt financing for a large portion of the development cost. The typical scenario is for a developer to pay a down payment on a piece of land, with a mortgage loan for the remainder of the purchase price, and then arrange a construction loan to supply funds for all expenses incurred between the time of purchasing the land and selling the completed development. The funds for this loan would be advanced periodically as cash flow is needed for the development. These advances could be based on a pre-set schedule of cash flow requirements or could be an open line of credit to a certain limit, or any other arrangement which is made with a lender. The loan would generally be interest

accruing, requiring payment of principal plus interest at the end of the loan term. Many of these construction loans also have arranged long-term take out commitments for the end of the term to add security for the construction lender.

The calculations for this construction loan will generally involve fairly detailed present value analysis. The cash flow advances for each period will have to be accumulated and accrued interest calculated.

Developer's Profit:

The amount remaining after deducting all of the expenses above must be enough to cover the cost of purchasing land plus a profit for the developer. The required developer's profit could be stated in many ways. Some of the possibilities include a lump sum amount, a percentage of gross or net value on completion, or a percentage of total project cost. The latter method can involve a complicated calculation, as the developer's profit is based on total cost, which also includes land and land financing, both of which are unknown at this point.

Residual to Land and Land Financing Cost:

A developer must purchase a plot of land before a development project can be undertaken. In most situations, a developer will want to finance at least part of the price of the land, and will pay a portion as a down payment (the developer either does not have enough money today to pay for the entire land purchase price, or wants to take advantage of financial leverage). This loan will accrue interest over the development period until the project is built and sold, when there will be proceeds to repay the loan amount plus interest.

The residual to land and land financing cost is the amount of proceeds remaining from the sale of the completed project once all expenses associated with developing the land (including profit) have been deducted. This residual amount will consist of accumulated interest on the land loan (if financing was used), plus the future value of the land cost.

Land Financing Cost:

The interest on the land loan should be a simple calculation, as it is just an interest accruing loan. However, the calculation is complicated because the land cost is still unknown (and is in fact what we are trying to find). The interest on this loan has to be expressed algebraically, in terms of the unknown land variable. If you are working under the assumption that no down payment is provided by the developer and the purchase price of the land is provided 100% by debt financing, this makes the calculation slightly easier. However, it is not a very realistic assumption, as most development projects will require at least some equity.

The following illustrates how this financing cost could be expressed using formulas:

Loan balance at end of term	$=$ original loan amount $+$ interest
	$=$ original loan amount $\times (1+i)^n$
	$=$ (total land cost $-$ equity) $\times (1+i)^n$
Interest on land loan	$=$ loan balance at end of term $-$ original loan amount
	$=$ [(total land cost $-$ equity) $\times (1+i)^n$] $-$ (total land cost $-$ equity)
	$=$ (total land cost $-$ equity) $\times [(1+i)^n - 1]$

Land Residual:

The land residual is the amount remaining when all expenses of the development project other than land have been covered. This residual would be used to repay the principal of any financing used to purchase the land, together with a repayment of the initial equity invested (the interest on the land loan and the return on the developer's equity have been already been accounted for above). To determine the maximum amount that should be bid for a plot of land today by the developer, the present value of this land residual should be calculated. However, what makes this calculation difficult is that the land residual figure is expressed as a formula, not as a dollar figure. To calculate the present value of this requires solving for the unknown in the discounting formula.

Example

You have found a block of vacant land for sale which you believe would be a good site for an apartment building. You want to put in a bid, and as you believe that this is a highly desirable site for other developers, you want to ensure that your bid is the maximum possible. Following are your projections for this development:

- can build one hundred units, 1,500 square feet each (net saleable area of 150,000 square feet)
- the building efficiency will be 80%, with a gross buildable area of 187,500 square feet
- development will take 6 months to build and sell
- estimated sale price of each unit will be $150,000
- closing costs will be 3% of gross value upon completion
- hard costs will be $50 per square foot of gross buildable area
- soft costs (including property tax, consulting fees, and legal fees) will be 20% of hard costs
- cash for hard and soft costs will be advanced in 6 equal advances at the beginning of each month in the development process. Interest will accrue at a rate of $j_{12} = 12\%$ with all principal and interest due at the end of the 6 month construction phase.
- developer's profit will be 15% of the net value upon completion
- land purchase will be 80% financed, with an interest accruing loan at a rate of $j_{12} = 15\%$, with all interest and principal due at the end of 6 months.
- cash flows received in the future will be discounted at $j_{12} = 18\%$

Solution:

Gross value upon completion: 100 units @ $150,000 per unit	$15,000,000
− costs of sale (3%)	450,000
Net value upon completion	$14,550,000
− hard cost: $50 × 187,500 sq.ft.	9,375,000
− soft cost: 20% × $9,375,000	1,875,000
− development financing cost*	400,379
− developer's profit: 15% of $14,550,000	2,182,500
Residual to land and land financing cost	$ 717,121
− land financing cost**	?
Land residual ***	?

To find the land financing cost and the land residual, the formulas shown in the following supporting calculations must be solved algebraically. Once the land residual is found, the maximum bid price for the land today can be calculated using present value analysis (based on a discount rate of $j_{12} = 18\%$).
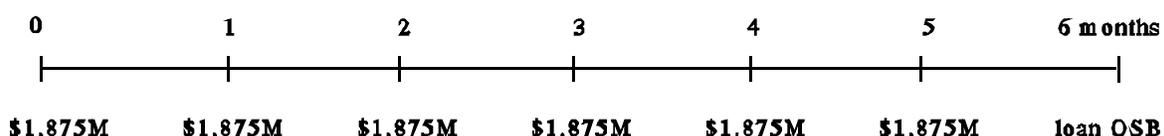
Supporting calculations:

Development Financing Cost:

Total development cost is $9,375,000 hard costs plus $1,875,000 soft costs. This amount will be paid out in 6 equal instalments at the beginning of each month.

$= (\$9,375,000 + \$1,875,000) \div 6$
$= \$1,875,000$

0	1	2	3	4	5	6 months
$1.875M	$1.875M	$1.875M	$1.875M	$1.875M	$1.875M	loan OSB

Interest owing at the end of 6 months:

Interest rate: $j_{12} = 12\%$ (or $i_{mo} = 1\%$)

$$FV = 1,875,000\ (1+.01)^6 + 1,875,000\ (1+.01)^5 + 1,875,000\ (1+.01)^4$$
$$\quad + 1,875,000\ (1+.01)^3 + 1,875,000\ (1+.01)^2 + 1,875,000\ (1+.01)^1$$
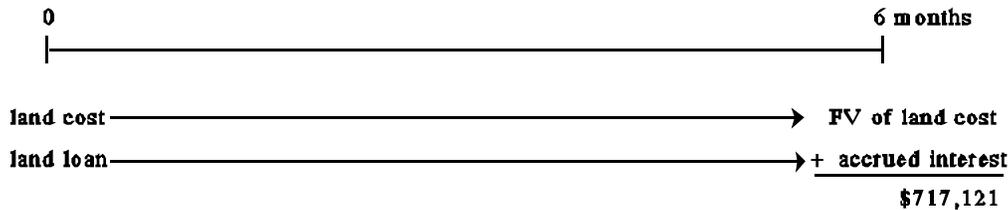$$FV = \$11,650,378.52$$

Interest $= FV - PV = \$11,650,379 - 11,250,000 = \$400,379$

Land Financing Cost:

Amount available for land and land financing $= \$717,121$

Purchase of land was 80% financed, therefore original land loan can be shown as 0.8 L
(where L = present value of total land cost)

Therefore, future value of land cost (equity + debt) plus accrued interest on land loan must equal $717,121

$$
\begin{aligned}
\text{Interest on land loan} \ &= \ (\text{total land cost} - \text{equity}) \times [(1+i)^n - 1] \\
&= \ 0.8L \times [(1+.0125)^6 - 1] \\
&= \ 0.0619065L
\end{aligned}
$$

The dollar amount of the land financing cost can be calculated once the land residual (and therefore the amount of the land loan) are calculated.

Land Residual:

Residual to land and land financing cost $= FV$ of land cost $+$ accrued interest
$$717,121 = L \times (1+.015)^6 + 0.0619065L$$
$$717,121 = 1.0934433L + 0.0619065L$$
$$1.1553498L = 717,121$$
$$L = 620,696$$

Since L is equal to the present value of the total land cost, the maximum bid price for the land today will be $620,696.

Summary and reconciliation:

If the developer pays $620,696 for the land today and the purchase is 80% financed, the financing will account for $496,557. At an interest rate of $j_{12} = 15\%$, this loan will accrue $38,425 interest over 6 months.

$$j_{12} = 15\%,\ i_{mo} = 1.25\%$$
$$
\begin{aligned}
\text{Interest} &= 496,557\ [(1.0125)^6 - 1] \\
&= \$38,425
\end{aligned}
$$

Therefore, the funds available for land at the end of 6 months would be $717,121 - 38,425 = \$678,696$. The present value of this at a discount rate of $j_{12} = 18\%$ is equal to $620,696.

Conclusion: Development Residual Method

The development residual method is a model which abstracts and simplifies reality. However, it is a fairly good approximation of investor behaviour, combining discounted cash flow techniques, and the income and the cost methods of appraisal. This development method is best used in situations where no applicable direct sales evidence can be found. This method requires extensive forecasting, with many assumptions required, such as absorption rates, discount rates, and market trends. Considerable research must be done in order to ensure that these estimates are as accurate as possible. In this model small changes in assumptions could have a large effect on value, so a sensitivity analysis may be useful to test the impact of the assumptions.