

## Valuation of Real Estate Investment Trusts (REITs)

**Objective:** The objective of this assignment is to introduce students to how to value real estate investment trusts aka REITs (pronounced R-E-E-T-s) using several methods commonly used by Wall Street analysts. As part of the valuation process, students will become familiarized with the use of information from a firm's Conference Call and a REIT's 10-K<sup>1</sup>.

**Subject Firm:** Archstone-Smith (NYSE: ASN), an S&P 500 company, is a recognized leader in apartment investment and operations. With a current total market capitalization of approximately \$19 billion, the company's portfolio is concentrated in many of the most desirable neighborhoods in the Washington, D.C. metropolitan area, Southern California, the San Francisco Bay area, the New York City metropolitan area, Boston, Southeast Florida, Chicago and Seattle. The company continually upgrades the quality of its portfolio through the selective sale of assets, using proceeds to fund investments in markets with even better growth prospects. Through its two brands, Archstone and Charles E. Smith, Archstone-Smith strives to provide great apartments and great service to its customers – backed by unconditional service guarantees. As of June 30, 2006, Archstone-Smith owned or had an ownership position in 267 communities, representing 82,491 units, including units under construction<sup>2</sup>. In terms of market share, Archstone-Smith Trust trails Equity Residential and AIMCO, the only apartment REITs that top it in sales. With its Archstone ("garden-style" apartments) and Charles E. Smith Residential (high-rise apartments) brand names, Archstone-Smith aims to become the top apartment landlord in its core markets.



Archstone Arrowhead  
7701 W. St. John Rd.  
Glendale, AZ 85308

**Competitors:** Apartment Investment and Management (AIV), Avalon Bay (AVB), Equity Residential Properties (EQR), and United Dominion Realty (UDR)

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<sup>1</sup>A 10-K report is similar to the annual report, except that it contains more detailed information about the company's business, finances, and management. It also includes the bylaws of the company, other legal documents, and information about any lawsuits in which the company is involved. All publicly traded companies are required to file a 10-K report each year to the SEC.

<sup>2</sup>Taken verbatim from <http://www.archstonesmith.com/about/index.htm>

**Assignment:** Download the real estate data from my website (REITVal2007.xls) together with the pdf files on the February conference call and 2005 10-K for Archstone Smith. Use the downloaded spreadsheet to answer the following questions. Please highlight your answers in **yellow** and turn in a hard copy of your results. Since you will most likely use this case as an example of what you can do for a firm, please use a Wall Street Investment Banking format/presentation style. ***This is an individual assignment.***

1. Cash flows to REITs. (25 points) Calculate the 2005 net operating income (NOI), EBITDA, Funds from Operations, and Funds Available for Distribution for Archstone-Smith, our subject REIT, and its primary competitors. To calculate NOI, FFO, and FAD use the worksheet labeled “1. Calc IncStmt” worksheet and fill in the cells **highlighted in yellow**. Information on each REIT can be found in the various 10K worksheets.
2. Net Asset Value (NAV) (25 points). When evaluating public companies, investors generally focus on price-to-book ratios as one valuation measure. However, price-to-book ratios are inappropriate for REITs since a REIT's book value, which is based on historic cost figures, might not accurately reflect the earnings capacity of otherwise well-maintained assets. Thus, many analysts prefer to use net asset value as a surrogate for book value, which is appropriate given that book value is meant to represent an entity's liquidation value. Using the “2. Calc Net Asset Value (NAV)” worksheet together with assumptions listed on the last page of this case, calculate the NAV per Share for Archstone-Smith. Note: In our calculation of NAV, recurring capital expenditures (capex) is subtracted from expected NOI since capex is necessary for the property to continue to generate and maintain the current level of cash flow. Most analysts on Wall Street do not subtract recurring capex in calculating NAV.
3. Relative Valuation of REITs (25 points). Calculate the justified price for Archstone-Smith (ASN) using the worksheet labeled “3. ValMultiples” together with information provided in the “Prices and Analyts Estimates”, “1. Calc IncStmt” and the various 10-K REIT worksheets. What multiple(s) appears to be the most reliable? Why? Please explain. Is ASN overvalued, undervalued or correctly priced as of 3/24/2006? Are the justified values based on multiples of total enterprise value (TEV) consistent with the equity multiples? Why or why not? Please provide some economic intuition.
5. Built-Up Beta for Archstone Smith? (10 points). Calculate the built up beta for Archstone Smith using the “4. BuiltUp Beta “ worksheet. To calculate the levered betas for its competitors using 60 months of return data, you will need to use the returns for each REIT and the market (EQREIT) located in the “Returns” worksheet. Appendix A contains an example of how to use the SLOPE function in Excel to calculate the levered beta. To calculate the unlevered beta ( $\beta_U$ ), the following formula is used:

$$\beta_U = \beta_L / (1 + ((1 - \tau) D/E))$$

where  $\beta_L$  = average levered beta for the **peer group/competitors**

$\tau$  = marginal tax rate which in our case is zero (0)

D/E = average debt (D) to equity (E) ratio for the **peer group/competitors**

To calculate the built-up beta for Archstone Smith, use the following formula which is the same formula as above except with different inputs

$$\beta_L = \beta_U (1 + ((1 - \tau) D/E))$$

where  $\beta_U$  = unlevered beta that you have calculated

$\tau$  = marginal tax rate which in our case is zero (0)

D/E = debt to equity ratio for **Archstone Smith**

To calculate the historical beta, use the SLOPE function and use the monthly returns for Archstone-Smith as the dependent variable (Y) and EQREIT monthly returns as the independent variable (X).

6. Risk Premium for REITs (5 points). Calculate the arithmetic average for equity REITs and the 10 year treasury bond over the periods from 1972-2005, 1980-2005, and 1990-2005 using the “5. Calc RiskPremium” worksheet. Next, calculate the geometric average for equity REITs and treasury bonds over the periods from 1972-2005, 1980-2005, and 1990-2005. Calculate the risk premium using the 10 year treasury bond as the riskfree rate based on arithmetic averages. Do the same risk premium calculations based on geometric averages. (**Hint:** Use the Average function and Geomean function. Before using the Geomean function, you must first transform the given returns e.g., let the  $R = 1 + \text{return}$  to avoid an error sign #NUM in taking the nth root of a negative product). Round your answers to 4 decimal places. As an example of how to use the Geomean function, the geometric mean of equity REITs over the 1972-2005 period in cell E40 is =GEOMEAN(E3:E36)-1. From your finance class, recall that the risk premium is

$$(R_M - R_F)$$

where  $R_M$  = market proxy; we use Equity REITs (EQREIT) as our market proxy

$R_F$  = risk free yield; we use the yield on 10 year Treasury bond

7. Dividend Discount Model for REITs (10 points). Calculate the justified price per share for Archstone-Smith REIT using the “6. DDM using ASN FAD” worksheet for the dividend discount model together with information from the “Prices and Analyts Estimates”, “4. BuiltUp Beta”, and “5. Calc RiskPremium” worksheets. Is ASN undervalued, overvalued or correctly priced according to the constant growth model?

## Assumptions Used in Valuing Archstone Smith:

Line Item	Assumption
Date of analysis	March 24, 2006
Growth rate in Rental Revenue	For same store sales growth, please refer to management's statements in the conference call. Use the mid-point of the stated range. For non-same store sales growth, analysts are expecting a 90% growth rate.
Growth rate in Rental Expenses and Property Taxes	For same store growth in rental expenses and property taxes, please refer to management's statements in the conference call. Use the mid-point of the stated range. For non-same store growth, analysts are expecting a 70% growth rate.
Weights for Same Store and Non-Same Store growth	$w_{\text{Same Store}} = .695$ and $w_{\text{Non-Same Store}} = .305$ . These weights are derived from the NOI segment analysis on page 85 in the 10K
Weighted Average Growth Rate – Rental Revenue, Expenses, and Property Tax	$(g_{\text{Same Store}} * w_{\text{Same Store}}) + (g_{\text{Non-Same Store}} * w_{\text{Non-Same Store}})$ Where g is the expected growth rate and w is the weight (see above)
NOI from assets held for sale	Assumed that there is no net operating income from assets held for sale
Management fee/Rental Revenue	Management fee is 3% of rental revenue
Recurring CapEx/NOI	Refer to management's statement in conference call
Depreciation on Real Estate Investments – Unconsolidated Entities	Assume that this remains constant in Year 2006 from Year 2005
Income from unconsolidated entities	Refer to management's statement in the conference call. Use the mid-point of the stated range.
Cap Rate	5%
Rental Revenue 2006	$\text{Rental Revenue}_{2005} * (1 + \text{wtd avg growth rate})$
Rental Expense 2006	$\text{Rental Expense}_{2005} * (1 + \text{wtd avg growth rate})$
Property Taxes 2006	$\text{Property Taxes}_{2005} * (1 + \text{wtd avg growth rate})$
Value of Ameriton net operating income	Please refer to the 10-K for Archstone Smith under segment analysis.
Value of Ameriton gains, net of disposition costs	Please refer to the 10-K for Archstone Smith under segment analysis. Since it is stated in millions be sure to convert it to thousands since the NAV analysis is stated in thousands (000s)

### Assumptions Used in Forecasting Financial Statements:

Line Item	Assumption
Communities under construction	See breakdown of <i>Investments in Real Estate</i> in the footnotes to the 10-K
Development communities in Planning	See breakdown of <i>Investments in Real Estate</i> in the footnotes to the 10-K
Ameriton (investment for development communities)	See breakdown of <i>Investments in Real Estate</i> in the footnotes to the 10-K
Other real estate assets (including land)	See breakdown of <i>Investments in Real Estate</i> in the footnotes to the 10-K
Non-convertible preferred stock-units	This is the Perpetual Preferred Shares
Total Debt	Do NOT treat the credit facility as part of total debt. Rationale: revolvers are usually treated as working capital.
Cash & Equivalents	Does NOT include restricted cash a.k.a. cash in escrow
Marginal tax rate	0%; Archstone Smith doesn't pay any taxes since it is a REIT.
Beta	Use the SLOPE command in Excel to calculate the levered beta. Use 60 months of returns. The Y variable is the return on the REIT and the X variable is the return on the market. We use the Equity REIT returns from NAREIT as the market proxy (X variable).

## Appendix A: Calculating Levered Beta

The easiest method to calculate a levered beta in Excel is to use the SLOPE function. If you use Microsoft Help to look up SLOPE, the following information is provided:

Returns the slope of the linear regression line through data points in known\_y's and known\_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

Syntax

**SLOPE(known\_y's,known\_x's)**

Known\_y's is an array or cell range of numeric dependent data points.

Known\_x's is the set of independent data points.

In our case, the Y variable is the return on the REIT and the X variable is the return on the market. We use the Equity REIT returns from NAREIT as the market proxy (X variable). For purposes of illustration, we will use returns for Camden Property Trust (Ticker: CPT) to show how to calculate the slope. To calculate the slope for this case, you will need to use **60 months** of return data rather than the 12 months shown here.

	A	B	C	D	E	F
1	<b>DATE</b>	<b>CPT (Y)</b>	<b>EREIT (X)</b>			
2	20050131	-0.11157	-0.08397			
3	20050228	0.024057	0.030669			
4	20050331	0.027263	-0.0155			
5	20050429	0.084414	0.053193			
6	20050531	0.011961	0.03466			
7	20050630	0.053769	0.050273			
8	20050729	0.028465	0.071366			
9	20050831	-0.05391	-0.03657			
10	20050930	0.078107	0.005958			
11	20051031	0.010762	-0.02366			
12	20051130	0.047028	0.042134			
13	20051230	-0.00754	-0.00199			
14						
15		Beta	0.96	=SLOPE(B2:B13,C2:C13)		
16						
17						