



## APPENDIX 11B

# INTRODUCTION TO THE ARGUS<sup>®</sup> LEASE-BY-LEASE SOFTWARE PACKAGE

### APPENDIX OUTLINE

Part I: Background: Example Office Building Proforma  
Part II: Tutorial  
Part III: Examining Alternative Input Assumptions  
Question to Answer and Reports

The purpose of this assignment is to familiarize yourself with a type of real estate financial modeling software known as “lease-by-lease” analysis packages. These types of programs are in widespread use among commercial property investment analysts, advisors, lenders, property managers, and appraisers. ARGUS<sup>®</sup>, produced by Realm Business Solutions of Houston, Texas, is a market leader in the world of lease-by-lease analysis packages. ARGUS provides a relatively user-friendly environment to enter information about the current leases in a building and about the rental market in which the building is situated (user judgment), from which ARGUS then calculates the expected future cash flow from the building. You can also enter loan parameters, and ARGUS will indicate cash flows before and after debt service. ARGUS is very useful for sensitivity analysis, comparing the cash flow and present value impacts of different lease or rental and expense assumptions or scenarios. The end product of an ARGUS model is a series of reports, including cash flow and rent roll reports that can be either printed directly or imported into a general-purpose spreadsheet program such as Microsoft Excel<sup>®</sup>.

In this assignment, you will walk through a simplified example that contains some the essential features of a typical medium-size class A– or B+ office building investment. This period is chosen to allow you to work within the limitations of the trial version of ARGUS that is included on the CD packaged with the textbook.

There are two parts to this assignment. The first part of the assignment presents a brief office case study that is used in an ARGUS “tutorial.” In this part of the assignment, you will step through some of the basics of ARGUS. In the second part of the assignment, you will be asked to change the input assumptions and report your findings. ARGUS has a robust help section that should prove useful if you have questions about how the program works.

### Part I: Background: Example Office Building Proforma

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The office building is Rentleg Plaza, which has 30,000 net rentable square feet divided into two office suites. Suite 100 is 20,000 SF and is leased out under a five-year lease signed two years ago (three more years left on the lease) at \$15/SF/year. The case is written as if it is the

end of 1999, so the lease expires in three years at the end of 2003. The other office, Suite 200, is 10,000 SF and is currently vacant.

In the market where Rentleg Plaza is located, the past few years have seen the office market softened greatly due to excess supply of newly built space. As a result, rents have fallen, and the currently typical rental rate in the market for buildings like Rentleg Plaza is \$14/SF on five-year leases, with concessions amounting to one month of free rent for each year of lease term taken at the beginning of the lease (e.g., a five-year lease would get the first five months rent-free). In these conditions, you expect Suite 200 will not lease up for a year (i.e., expected occupancy after 12 months, at the beginning of 2002, in a five-year lease running through 2006) and will require \$10/SF in Tenant Improvement expenditures by the landlord at that time.

With virtually no new office building development on the horizon, it is likely that the present modest growth in office demand will bring the rental market back into equilibrium within, say, three years, so that by 2003 we will be back into something like equilibrium. In these circumstances, it is reasonable to forecast no growth in rental rates in the market for the next two years (2000–2002) followed by a rent growth “spike” of, let’s say, 20 percent, in 2003, with then no further growth in rents for the next few years beyond that time. We would also expect the rent concessions (e.g., the free rent up front) to disappear from typical market deals by 2003.

Suppose it is reasonable to assume that when the lease on Suite 100 expires, there is only a 50 percent chance the existing tenant will renew. If they do not renew, there will be six months vacancy in the space, and it will require \$10/SF in tenant improvement expenditures paid for by the landlord plus a 6 percent commission to a leasing broker to obtain a new tenant. On the other hand, if the current tenant does renew (50 percent probability), it will require only \$3/SF in TI plus a 3 percent brokerage commission. The brokerage commissions are paid by the landlord, up front at the time the lease is signed, based on the entire cumulative revenue of the lease, less free rent concessions. For example, a 5 percent commission on a 10-year, \$10/SF lease would be \$5/SF if there were no concessions, or \$4.50/SF if there were one year of free rent.

The type of lease that is common in the market in which Rentleg Plaza competes is what is known as a “gross” or “full service” lease, with an “expense stop.” This means that the landlord pays the building operating expenses, except that the tenant pays their pro rata share of any expenses over and above a “stop” amount specified in the lease. The “stop” amount is typically defined at or near the annual operating expenses (per square foot) that the building was experiencing as of the time when the lease was signed. The expense stop on the existing lease in Suite 100 is \$4/SF.

The current operating expenses of the building (projected for 2001) would be \$4.81/SF if the building were fully occupied all year. However, the building is expected to be 33 percent vacant during the year, which will keep operating expenses down a bit. In fact, 19 percent of the operating expenses are “variable,” that is, directly proportional to occupancy, while the remaining 81 percent are “fixed” (independent of occupancy). Thus, the 2001 projected expenses are \$135,161 {calculated as  $30,000 \times \$4.81 \times [0.81 + (20,000/30,000) \times 0.19]$ }. Operating expenses are expected to grow at the rate of 4 percent per year.

In addition to normal operating expenses and the previously noted leasing and tenant improvement expenditures, there is also expected to be \$1/SF/year of general capital improvement expenditures.

The following table presents the proforma as a spreadsheet. (See the ARGUS Intro spreadsheet on the accompanying CD.) Assuming reversion at the end of year 5, with a sale price equal to 10 times the following year’s expected Net Operating Income (NOI), and at a discount rate of 12 percent per annum, Rentleg Plaza has a present value of \$2,293,000.

**Rentleg Plaza, Five-Year Proforma Cash Flow Projection**

	1999	2000	2001	2002	2003	2004	2005
Market Rent		\$14.00	\$14.00	\$14.00	\$16.80	\$16.80	\$16.80
Potential Gross Revenue:							
Rent Roll:							
Suite 100		\$300,000	\$300,000	\$300,000	\$336,000	\$336,000	\$336,000
Suite 200		\$140,000	\$140,000	\$140,000	\$140,000	\$140,000	\$140,000
Total		\$440,000	\$440,000	\$440,000	\$476,000	\$476,000	\$476,000
Vacancy		(\$140,000) <sup>1</sup>		(\$84,000) <sup>2</sup>			
Abatements			(\$58,333) <sup>3</sup>				
Reimbursements:							
Suite 100		\$10,107 <sup>4</sup>	\$20,048 <sup>4</sup>	\$24,050 <sup>4</sup>	\$0 <sup>5</sup>	\$7,755 <sup>5</sup>	\$12,257 <sup>5</sup>
Suite 200			\$24 <sup>6</sup>	\$2,025 <sup>6</sup>	\$2,393 <sup>6</sup>	\$6,270 <sup>6</sup>	\$8,521 <sup>6</sup>
Total		\$10,107	\$20,072	\$26,075	\$2,393	\$14,025	\$20,778
Total Revenue		\$310,107	\$401,739	\$466,075	\$394,393	\$490,025	\$496,778
Operating Expenses		\$135,161	\$150,072	\$156,075	\$157,178 <sup>7</sup>	\$168,811	\$175,563
Net Operating Income:		\$174,946	\$251,667	\$310,000	\$237,215	\$321,215	\$321,215
Leasing & Capital Expenditures:							
Tenant Improvements			\$100,000		\$130,000 <sup>8</sup>		
Commissions			\$38,500 <sup>9</sup>		\$75,600 <sup>10</sup>		
Capital Expenditures		\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	
Total		\$30,000	\$168,500	\$30,000	\$235,600	\$30,000	
Operating PBTCF		\$144,946	\$83,167	\$280,000	\$1,615	\$291,215	
Reversion						\$3,051,541 <sup>11</sup>	
PBTCF		\$144,946	\$83,167	\$280,000	\$1,615	\$3,342,755	
Present Value @12%:		\$2,292,810 <sup>12</sup>					

<sup>1</sup> Based on Suite 200 vacant all year.

<sup>2</sup> Based on Suite 100 expected vacancy (50% × 6 months = 25% of Potential Gross Revenue from Suite 100).

<sup>3</sup> Based on free rent concession of five months offered to new lease in Suite 200.

<sup>4</sup> Based on expense stop of \$4/SF in the existing lease in Suite 100.

<sup>5</sup> Based on expense stop in new lease exactly equal to projected operating expenses per square foot in 2003.

<sup>6</sup> Based on expense stop of \$5/SF in the new lease in Suite 200.

<sup>7</sup> Reflects expected vacancy of 50% × 6 months = 0.25 of a year in Suite 100 in 2003.

<sup>8</sup> Reflects expected renewal probability: (50% × \$10/SF + 50% × \$3/SF) × 20,000 SF.

<sup>9</sup> Reflects free rent concession: 0.06 × (5 × 14 – (5/12) × 14) × 10,000.

<sup>10</sup> Reflects expected renewal probability: (50% × 0.06 + 50% × 0.03) × (5 × \$16.80/SF) × 20,000 SF.

<sup>11</sup> Reflects selling broker's commission of 5 percent taken from sales price equal to 10 times next year projected NOI.

<sup>12</sup> Assumes first cash flow occurs one year from present

## Part II: Tutorial

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This tutorial should take you one to two hours. You don't need to do it all in one sitting.

To begin to create an ARGUS file on a new property, select the **File** drop-down menu and **New** .... To instead open a pre-existing ARGUS file, you would select **Open** ..., or to make a new version of an existing file, select **Copy ... and Duplicate File** .... If the "New" window comes up, give your file a name (such as the first four letters of your last name followed by the numeral "1" to indicate that this is the first scenario of version of the proforma for this building). Don't forget to change the path so that the ARGUS file you will be creating will be saved where you want it in the **Description** window that comes enter the property name, "Rentleg Plaza." The **Description** menu is found in the **Property** drop-down menu in the main menu, if it does not come up automatically. If this were a real property, you would then enter the rest of the actual information (address, etc.). Our example property is of the "office/industrial" type. Click on "OK."

**One of the useful features of ARGUS is that it explains, at the bottom of the window, the nature of the input item where your cursor is located on the screen. Always read this information before entering the input.**

Recall that we are working with a 30,000 SF office building. So, in the **Property** menu, **Area Measures** window, select "**Property Size**" and "**Edit ...**" and then enter 30000 in the "size" box. Click on OK, and then close the Area Measures box to get back to the main menu.

Now within the **Property** drop-down menu, click on the **Timing** menu. Assume the analysis period starts at the beginning of 2000 (1/00). We will do a five-year analysis from 1/00, and we will have our reporting start on 1/00 as well.

Go back to the main menu and select **Property, Inflation Rates ...** menu and edit **General Inflation**. Assume a general inflation rate of 4 percent per year for all the years in the analysis. Note, however, that we could have entered different inflation rates for each year and that this general inflation rate can be overridden for specific variables later on.

Now from the **Property** drop-down of the Main Menu, select **Reimbursable Expenses**. (Note that in our building, the leases are of the Expense-Stop type.) To have this type of lease, we need to use the Reimbursable Expense Menu.

In the Reimbursable Expense Menu, press the **insert** button to describe the expense categories in the property. To simplify matters, we have assumed our example building has only a single all-encompassing category of operating expenses, which you should label "General Expenses" in the "Name" column. More realistically, there would be several categories of expenses, each with possibly different percents fixed and inflation rates. Enter the amount of \$4.81/SF/year as the current expense **Amount** (unit is \$/Area). This \$4.81/SF would be the expense amount if the building were fully occupied, so select "**Property Size**" in the Area box. Enter 81 in the %Fixed item, to reflect the assumption that 81 percent of the expenses are fixed while 19 percent are directly proportional to building occupancy. In reality, this percentage would vary with different categories of expenses. For example, property taxes and insurance expenses are usually assumed to be 100 percent fixed, while many other expenses, such as maintenance & repairs, utilities, and management, are at least partially variable, depending on the nature of the building (e.g., size of the common area or security needs). This 81 percent assumption will give projected operating expenses of approximately \$4.50/SF in 2000 with the building 2/3 occupied, with reimbursement based on actual occupancy, so as to agree with our example assumptions. We assume that expenses would grow at the general inflation rate of 4 percent per year on a constant-occupancy basis, so we don't need to enter any special inflation assumptions in the "Inflation" box.

Now go to the **Capital Expenditures** menu in the Property drop-down. Recall that in the example, there are general building improvement expenditures of \$30,000 per year, every year. We can get ARGUS to reflect this pattern of capital improvement expenditure by inserting a capital expense item and entering 30000 in the amount item, "\$ Amount" in the units item, "year" in the frequency item, 100 in the %Fixed item, and 0 in inflation. This overrides the 4 percent inflation assumption made earlier.

From the Main Menu, select the **Market** drop-down and the **Market Leasing Assumptions** menu. It is in the Market Leasing Assumptions Menu that you tell ARGUS what to assume about the future rental market in which your property is situated. Conceivably, you might want to identify more than one sub-market in which your building operates. For example, some of your space might be “Class A” while other parts of your building might be “Class B.” Or, you might have some retail space, some office space, and/or some warehouse space in your building. Or, more commonly, there might be a particular space in the building that is oddly shaped or sized, so that it is difficult to lease out at the same rate as the rest of the building (and/or, it would typically remain vacant longer between tenants). ARGUS thus allows you to specify more than one Market Leasing Assumption Category. In the Rent Roll Menu (which we will get to in a minute), you will then tell ARGUS which category of market assumptions to apply to which space in the building. Thus, when you select the Market Leasing Assumptions Menu, you have the choice of creating a new category or editing and existing category. Initially, you will select the **New** button. In the example, all the spaces are in the same sub-market and are equally easy to lease, so we will identify only one market leasing category, which we will call “Office Mkt.” When you initially enter the Market Leasing Assumptions Menu, you must name the Market Assumption Category, so name it as “Office Mkt.”

Now fill in the table in the Market Leasing Assumptions Menu with the appropriate assumptions to reflect the assumptions in the example. The renewal probability is **50** percent, and the current market rent is \$14.00/SF; so, enter **14** under the **New Market** column. You can leave the market rent row blank for the subsequent columns to the right (“Renewal Mkt,” “Term 2,” etc.), as we will be taking care of that in the “Inflation Rates ...” menu. Enter **6** in the Months Vacant row under **New Market**, **10** dollars in the Tenant Improvements item under the **New Market**, but only **3** dollars for that item under the **Renewal Market** column. Enter **6** percent Leasing Commission for the **New market** but only **3** percent for the **Renewal Mkt**. We are handling the Rent Abatement in the Space Absorption section so leave this item blank for both the **New Market** and the **Renewal Mkt**. Recall that we assumed there would be no further rent abatements after the Suite 200 lease; so, enter **0** in all the subsequent Terms. In the bottom part of the Market Leasing Assumptions Menu, we tell ARGUS what type of leases we are dealing with in both the current and future market. Enter **Base Stop** in the Reimbursement category so ARGUS knows we are in a market where expense-stop leases are the norm. Finally, enter **5** in the Term Length category to indicate the typical length of leases in the market.

To deal with the expected inflation or growth rate in the market rent, we need to go back into the **Inflation Rates** and edit the “Market Rent” inflation rate assumption (unless we were simply going to use the default inflation assumption of 4 percent entered in the General Inflation menu, which in this case we are not). Consistent with our example, we assume zero percent growth in the market rent for the next three years (so, years 2000 through 2002 will all have market rents of \$14/SF; note that “year 1” is 2000), reflecting the current over-built soft leasing market. Then, we assumed a rent growth “spike” consisting of a one-year 20 percent increase in 2003 (year 4), followed by zero growth again after that. Thus, in the market rent inflation rates, you have 0, 0, 20, 0, 0, 0.

Now from the Main Menu, select the **Tenants** drop-down and get into the **Rent Roll** menu. In the Rent Roll Menu, you tell ARGUS what leases or spaces exist in the building and what rental rates, lease terms, and rental market leasing assumption categories apply to those leases or spaces. In the example, there were two spaces in the building (suites 100 and 200), the latter of which was vacant as of the beginning of the analysis period. While it is possible to treat vacant space in the Rent Roll Menu (by entering a future date in the “Start Date” column, reflecting the time expected until the space will lease), it is generally easier to treat large vacant spaces in the Space Absorption Menu. So, we only enter the one lease, the existing tenant in Suite 100, in the Rent Roll Menu. Recall, from the example, we assumed that lease had been signed a couple of years ago at \$15/SF, with three years remaining on the lease (through the end of 2002) and an expense stop at \$4/SF. Press the **insert** button in the Rent Roll menu. You can leave the tenant name blank, but fill in the suite # as **100**, of the

**office** type, with **20000** SF. The lease began two years ago on **1/98** and ends in three more years at **12/02**. The **Base Rent** is \$15/SF/Yr, with no rent changes, retail sales, abatements, or leasing costs, as these are all water over the dam for the existing lease and will be dealt with subsequently by the market leasing assumptions we entered in the Market Leasing Assumptions menu. In the **Reimbursements** item, enter **4** dollars to reflect the expense stop in the existing lease. In the Market Leasing column, we tell ARGUS to use Market Leasing Assumption “**Office Mkt**” Category we previously defined in the Market Leasing Assumptions Menu for the Suite 100 space. Upon expiration, the lease will be subject to the **Market**. This means that upon the expiration of the existing lease on Suite 100, ARGUS will apply the rental market leasing assumptions described in the “OfficeMkt” Category.

From the Main Menu next, select **Space Absorption** from the Tenants drop-down. In the Space Absorption Menu, indicate the space in your building that is currently vacant. ARGUS will automatically have this space “leased up” at a rate (over a time period), which you indicate in this menu. Depending on your judgment about the current rental market your building finds itself in, you may wish to have the space leased up rapidly or slowly, immediately or after a delay. The rate of lease-up should also depend on the rent to be charged (and concessions to be given) for the space, in relation to what is typically prevailing in the market today. In our example building, there was one vacant space, Suite 200 (10,000 SF). We assumed Suite 200 would remain vacant for the entire first year and then be leased out in a five-year lease at the prevailing market rent of \$14/SF with one month free rent for each year of lease term and an expense stop approximately equal to the second year’s expenses of \$5/SF. This is indicated in the Space Absorption Menu much as the Rent Roll menu was, only with some differences to reflect the vacant Suite 200 space. Insert a space description line for “**Suite 200,**” with **10000** SF in the **Office** type, available from 1/00 but we don’t expect it to **Begin Leasing** until 1/01 (to reflect the 12 months anticipated vacancy in the sluggish current market). There is **1** lease, with **annual** creation frequency. In this way, we tell ARGUS to lease out the entire Suite 200 all at once, after one year. Alternatively, ARGUS can gradually lease out the vacant space at the rate you indicate. Enter **5** years in the term expiration item and a **Base Rent** of **14** dollars with no rent changes or retail sales in the lease. The \$5 anticipated expense stop is reflected in the **Reimbursements** item, and the **5** months anticipated free rent is in the **Rent Abatements** item. Enter **Yes** in the Lease Cost item, and fill in the details to tell ARGUS that the tenant improvement allowance will be **10** dollars and the leasing commission will be **6** percent. Enter **Office Mkt** in the Market Leasing assumption, and expose the space to the **Market** upon lease expiration. In a more complicated building, you could identify other vacant spaces or groups of spaces, for example, if there were several different vacant offices, or if you wanted to treat some space as leasing up quickly while other space leases up slowly.

Back at the Main Menu, we need to keep the leasing cost assumption constant to be consistent with our Part I example. We assumed there, perhaps unrealistically but simply, that the Tenant Improvements would always be \$10 or \$3. To do this, we need to go once again to the **Inflation Rates** menu and edit the **Leasing Costs** inflation to have **0** in all years.

Now in the Main Menu, select the **Yield** drop-down and get into the **Property Resale** menu. Leave the “Initial Purchase Price” blank (you would only fill this in if you wanted to have ARGUS determine the IRR of property at a given price). The most common way to calculate the resale price is to capitalize the net operating income the property will be earning at the time of the resale, so select this option. The assumed going-out cap rate is **10** percent, with a **5** percent sales commission. Check the box to apply the cap rate to the **following year**. Click **OK** to get back to the Main Menu.

Now we have completed all of our cash-flow-related inputs for the example building we considered in Part I. We need only to tell ARGUS what discount rate to apply in order to get ARGUS to calculate the present value of the example property. To do this, go to the **Yield** drop-down from the Main Menu and access the **Present Value Discounting** Menu. As investors are often not sure exactly what discount rate is correct, ARGUS allows a sensitivity analysis to be easily conducted using different rates. However, in theory, only one rate can be

correct (in the sense of reflecting the true *market* opportunity cost of capital as of a given point in time). We selected a 12 percent rate in the example in Part I. If you want to use only a single discount rate, enter that rate in the Primary Discount Rate space and leave the Low and High rates blank in the Present Value Discounting Menu.

Now you are ready to have ARGUS calculate the cash flow projection and perform the valuation. From the Main Menu, select the **Reports** drop-down and select the **Property Level** reports. Check the “Schedule of Cash Flow from Operations,” the “Prospective Present Value Summary,” and the “Property Summary” reports, at the **annual** frequency. Press the **view** button to see the results. They should match those from the answer reproduced in Part I of this assignment. If your results do not match, try to figure out where the mistake is or refer to the Intro ARGUS file supplied on the CD. If your results match, ARGUS should not be a “black box” to you. You should understand what ARGUS is doing to arrive at its output numbers. To print results, press the **print** button. Notice that the “Export ...” button allows you to export ARGUS output to an Excel spreadsheet, or you can copy the output to Windows clipboard and paste into Excel as well.

Notice on the Present Value output that ARGUS tells what proportion of the present value comes from discounting the operating cash flows versus what proportion comes from discounting the reversion cash flow (Resale Proceeds). This is an important item to consider. In general, reversion cash flows are more risky than operating cash flows (future sale prices are hard to predict with accuracy). Therefore, it is considered desirable when employing the multi-year discounted cash flow (“Yield Capitalization”) method of valuation used here for no more than about half of the total present value to come from the discounted resale proceeds. In this case, over 75 percent of the present value comes from the reversion, which is probably unacceptable. The remedy would be to extend the analysis horizon to 10 years from 5 years, to push the reversion year farther back in time and give it a smaller discounted present value. This is the main reason why an analysis horizon of 10 years is typically used. The idea in multi-year discounted cash flow (DCF) valuation is to force the analyst to go through the exercise of trying to explicitly forecast the rental market and the building cash flows for the foreseeable future, to prevent “lazy” valuations that might overlook important influences on value.

## Part III: Examining Alternative Input Assumptions

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In this part of the assignment, you will generate some new ARGUS analysis. One of the great features of software packages like ARGUS is that it is very easy to quickly examine the cash flow and valuation impacts of alternative input assumptions. This is useful because the analyst is rarely completely sure about the exact value of many of the input assumptions he or she is using in the valuation. To examine alternative input assumptions in ARGUS, you create new versions using the **Copy/Duplicate File** option in the **File** menu. Do this by naming the new file “NAME2.” When you have completed the new inputs, print the results from the REPORTS Menu. (The same three reports are noted above.)

## Question to Answer and Reports

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The question you should examine is what is the effect if the rent growth “spike” occurs five years from now rather than four years from now as we assumed previously. This would seem to be a small change in our input assumptions. The analyst could easily be wrong by a year regarding when the market perceives or expects the rent spike will occur. Remember, for purposes of estimating the current *market* value of the property, it does not matter per se when (or even if) the rent spike actually will occur or when the analyst thinks it will occur. What matters is what the *market* (i.e., the typical investor who might buy the subject property) currently *thinks* or *expects* regarding when the rent spike will occur.

You should print out the changed versions of the three output reports noted previously in Part I (Cash Flow Schedule, Prospective Present Value, and Property Summary). On the first of these, circle the changes caused by the changed input assumption. On the second output report, write the *percentage* change in property present value caused by the changed assumption. Finally, from the REPORTS Menu, select **Market Leasing Assumptions** and press the **print** button.