

JAMES A. GRAASKAMP COLLECTION OF TEACHING MATERIALS
II. CLASSES AT THE UNIVERSITY OF WISCONSIN--MADISON
E. Business 550/705: The Real Estate Process
4. Case Study Examples

D

HANDOUT - Business 550: REAL ESTATE MATHEMATICS

Terms to Know

Amortization

The process of payment of a debt or obligation by a series of payments over time. Generally the payments are in equal amounts that include principal and interests; and generally the payments are made at uniform intervals of time.

Capital Gain

Income that is a result of sale of an asset and not from the general course of business. Capital gains are taxed at a lower rate than ordinary income.

Capitalization

The process of reflecting future income in present value; the discounting of the future income stream to arrive at a present value.

Capitalization Rate

The rate at which future income is discounted.

Cash Flow

The net income from a property before depreciation and other non cash expenses.

Depreciation

Loss in property value due to any cause.

Disposable Income

After tax income.

Equity

The value of the interest of an owner of property exclusive of the encumbrances on the property.

(g) In Yards.

1. Unless the district regulations provide otherwise, off-street vehicle parking is permitted in the following yards:
 - a. A rear yard.
 - b. A side yard not adjoining a street.
 - c. A side yard adjoining a street, including the extension of a street side lot line, but only on one paved or graveled driveway existing prior to April 1, 1978, not exceeding twenty (20) feet in width, and for not more than two (2) vehicles parked not nearer than three (3) feet to a side or rear lot line.
 - d. A front yard, but only on one paved or graveled driveway not exceeding twenty (20) feet in width and for not more than two (2) vehicles parked not nearer than five (5) feet to a front property line or three (3) feet to a side lot line.

(Sec. 28.11(3)(g)1. Am. by Ord. 6271, 6-9-78)

2. Regardless of the provisions of Paragraph 1, the Plan Commission may permit off-street vehicle parking in any yard of a residential development where the overall housing plan and design for such development, in the judgment of the Plan Commission, is substantially improved thereby, as compared to where off-street parking is limited by Paragraph 1, and where sole access from such development is to local and collector streets. In this paragraph, "substantially improved" means a substantial increase in the value of the property. Such permission shall be granted only after proceeding under Section 28.12(10). No such permission shall be granted for any residential development which is adjacent to either a public right-of-way or other residences unless sufficient and suitable screening is provided so as to prevent, to as great a degree as practicable, direct view of such off-street parking areas from such adjacent areas. (Am. by Ord. 7223, 1-29-81)

(h) Design and Maintenance.

1. Open and Enclosed Parking Spaces. Accessory off-street parking spaces located on the same lot as occupied by the use served may be open to the sky or enclosed in a building. Accessory off-street parking spaces located elsewhere than on the same lot occupied by the use shall be open to the sky, except when an off-site storage garage or parking structure is approved for such required accessory parking.
2. a. Surfacing. All open off-street parking areas, except a parking space accessory to a single-family dwelling, shall be improved with a bituminous or Portland cement concrete pavement or paving brick surface in accordance with City of Madison standards and specifications. Such parking areas shall be so graded and drained as to dispose of all surface water. Such parking areas shall also be so arranged and marked to provide for orderly and safe parking and storage of vehicles, and shall be so improved with wheel stops or bumper guards to prevent encroachment into adjacent lots or public ways. (Am. by Ord. 5800, 3-28-77)

Present Value Concepts

The entire concept of value is based on a determination of the present value (worth) of future dollars of anticipated income.

The driving force of present value determination is the concept of compounding of interest; only running backwards. Thus with compounding being of primary importance it is important to understand what compounding is and how it works.

By definition, compound interest is interest calculated on an accumulation of principal and prior earned interest--not on the original principal only. Compound interest is not paid when earned, but is added to the principal balance, thus causing the balance to continually change.

In contrast, simple interest is interest on original principal only. The base does not grow, for interest does not accumulate. It is paid and collected periodically as it is earned. For example, suppose we have 1,000 to invest and we have a choice of placing this money into (a) a simple interest account of (b) a compounding account, both at the same interest rate of 5%. Suppose further, that we have decided that regardless of which account is chosen we will leave the money in the account for five (5) full years.

Question: Which should we choose, (a) or (b)?

	(a)		Int. Paid
1.	1,000	*	.05 = 50
2.	1,000	*	.05 = 50
3.	1,000	*	.05 = 50
4.	1,000	*	.05 = 50
5.	1,000	*	.05 = <u>50</u>
			250

	(b)		Int. Paid	
1.	1,000	*	.05 = 50	= 1,050
2.	1,050	*	.05 = 52.50	= 1,102.50
3.	1,102.50	*	.05 = 55.125	= 1,157.625
4.	1,157.625	*	.05 = 57.88125	= 1,215.50625
5.	1,215.50625	*	.05 = <u>60.77631</u>	= 1,276.28156
			276.28	

Under proposition (a) the value of our investment is equal to the original deposit of 1,000 plus all interest earned, the 250, which is equal to 1,250. Under proposition (b) the same holds true, but since we earned an extra 26.28 of interest (276.28 - 250.00) the value of this proposition is equal to 1,276.28. Therefore, if our goal is to maximize our income during the five year investment period (holding period) we would choose proposition (b).

SIX FUNCTIONS OF A DOLLAR

* The mathematics of finance are based on three simple concepts:

- Present Value (PV) -- the value of a stream of cash flows as of "right now" (time 0).
- Future Value (FV) -- the value of a stream of cash flows as of a specific future date.
- Annuity (A) -- a series of equal cash flows at equal intervals of time.

* The six functions of a dollar are the six interest factors that allow one to convert one concept into another:

<u>Desired Value</u>	=	<u>Known Value</u>	x	<u>Interest Factor</u>
FV_n	=	PV_0	x	$(F/P, i, n)$
FV_n	=	A	x	$(F/A, i, n)$
A	=	FV_n	x	$(A/F, i, n)$
PV_0	=	FV_n	x	$(P/F, i, n)$
PV_0	=	A	x	$(P/A, i, n)$
A	=	PV_0	x	$(A/P, i, n)$

where: 0 denotes time 0,
 n " " " n (n years after time 0),
 i is the interest rate at which cash flows are compounded or discounted.

Note: The "numerator" of the interest factor notation indicates the unknown value that is being solved for (i.e., the desired value) while the "denominator" indicates the known value that is being converted.

With this basic comprehension of elementary compound interest, it is now possible to develop a knowledgeable basis for understanding the derivation, interrelationships, and functions of the six standard functions of a dollar.

Names of the tables vary in different texts, but the factors themselves are uniform. The following summarizes the basic function of each table and illustrates the interrelationship between the tables.

#1 AMOUNT OF 1 AT COMPOUND INTEREST

Shows: Growth at compound interest of a single initial deposit or investment. *recommended conceptual notation*

Formula: $S^n = (1 + i)^n = (F/P, i, n)$
actuarial notation

Example: (All examples taken from page 92 of Ellwood Tables.)
 What will 655 be worth after 5 years in an account compounding annually at 8-1/2%.

Factor (Col. #1 and 5 yrs.) 1.503657
 from $S^n = (1.0 + .085)^5$
 Table:

$PV_0 \times (F/P, 8\frac{1}{2}\%, 5\text{yrs.}) = FV_5$

Answer: $655 * 1.503657 = 984.89$ (rounded)

Proof: Yr. 1 - $655 * 1.085 = 710.67$
 Yr. 2 - $710.67 * 1.085 = 771.08$
 Yr. 3 - $771.08 * 1.085 = 836.62$
 Yr. 4 - $836.62 * 1.085 = 907.74$
 Yr. 5 - $907.74 * 1.085 = \underline{984.89}$

#2 ACCUMULATION OF 1 PER PERIOD

Shows: Growth at compound interest of a level, i.e. equal, series of periodic deposits.

Formula: $s\bar{n}| = \frac{S^n - 1}{i} = (F/A, i, n)$
 $\frac{(1+i)^n - 1}{i}$

Example: What will 166.23 deposited annually for 5 years be worth if the account compounds annually at 8-1/2%?

Factor (Col. #2, 5 yrs.) 5.925373
 from $s\bar{n}| = \frac{1.503657 - 1.0}{.085}$
 Table:

$A \times (F/A, 8\frac{1}{2}\%, 5\text{yrs.}) = FV_5$

Answer: $166.23 * 5.925373 = 984.97$ (rounded)

Proof: Yr. 1 - 0 + 166.23 = 166.23 * 1.085 = 180.36
 Yr. 2 - 180.36 + 166.23 = 346.59 * 1.085 = 370.05
 Yr. 3 - 370.05 + 166.23 = 542.28 * 1.085 = 588.37
 Yr. 4 - 588.37 + 166.23 = 754.60 * 1.085 = 818.74
 Yr. 5 - 818.74 + 166.23 = 984.97

Note: An annual deposit of 166.23 was made 5 times, but compounding took place only 4 times. The question states 5 equal deposits not 5 compounding periods.

#3 SINKING FUND

Shows: Amount of periodic deposit required which will grow at compound interest to a specified future amount.

$$\frac{i}{(1+i)^n - 1}$$

Formula: $1/S\bar{n} = \frac{1}{S\bar{n}-1} = \left(\frac{A}{F}, i, n\right)$

Example: An investor plans to repaint an apartment house in 5 years at an estimated cost of 985. What amount must be deposited annually for 5 years in a sinking fund savings account paying 8-1/2% annually?

Factor (Col. #3, 5 yrs.) .168766
 from $\frac{.085}{1.503657-1.0} = .168766$
 Table:

Answer: $FV_5 \times \left(\frac{A}{F}, 8\frac{1}{2}\%, 5\text{ yrs.}\right) = A$
 985 * .168766 = 166.23

Note: Special relationship between Table #2 and #3. They are just opposite each other, i.e. reciprocal.

Proof: See #2 above.

#4 PRESENT VALUE REVERSION OF 1

Shows: Present worth of a single future income payment. Computes and deducts compound interest from a known or assumed future worth, at a stipulated interest rate and for a given period of time.

$$\frac{1}{(1+i)^n}$$

Formula: $v^n = \frac{1}{S\bar{n}} = \left(\frac{P}{F}, i, n\right)$

Example: What is the most that an investor should pay today to receive an item worth 985 five years into the future, assuming an alternative investment rate of 8-1/2% annually?

Factor (Col. #4, 5 yrs.) .665045
 from $v^n = \frac{1.0}{1.503657} = .665045$
 Table:

Answer: $FV_5 \times \left(\frac{P}{F}, 8\frac{1}{2}\%, 5\text{yrs.}\right) = PV_0$
 $985 * .665045 = 655.069$

Proof: See Proof #1. Note special relationship between Tables #1 and #4, Reciprocal.

#5 PRESENT VALUE OF 1 PER PERIOD - ORD. ANNUITY

Shows: Present worth of a series of future income payments. Computes and deducts compound interest from any level (equal) terminal series of future income payments, such as a lease or annuity of any type.

$$\frac{1 - \frac{1}{(1+i)^n}}{i}$$

Formula: $a_{\overline{n}|} = \frac{1 - v^n}{i} = \left(\frac{P}{A}, i, n\right)$

Example: What is the most that an investor should pay today to receive 5 annual payments of 166.23 beginning 1 year from today, assuming an alternative investment rate of 8-1/2% annually?

Factor (Col. #5, 5 yrs.) 3.940642
 from $a_{\overline{n}|} = \frac{1.0 - .665045}{.085} = 3.940642$
 Table:

This same factor can be derived by summing the 5 annual factors for reversions, Col. #4.

Yr. 1 = .921659
 2 = .849455
 3 = .782908
 4 = .721574
 5 = .665045

Answer: $A \times \left(\frac{P}{A}, 8\frac{1}{2}\%, 5\text{yrs.}\right) = PV_0$
 $166.23 * 3.940642 = 655.05$

Proof: $655.05 * 1.085 = 710.73 - 166.23 = 544.50$
 $544.50 * 1.085 = 590.78 - 166.23 = 424.55$
 $424.55 * 1.085 = 460.64 - 166.23 = 294.41$
 $294.41 * 1.085 = 316.43 - 166.23 = 150.20$
 $150.20 * 1.085 = 166.97 - 166.23 = -.0326$ (Close enough)

#6 INSTALLMENT TO AMORTIZE 1

Shows: Amount of periodic payment required to amortize a loan.

Formula: $1/a_{\overline{n}|i} = \frac{i}{1-v^n} = \left(\frac{A}{P, i, n} \right)$

Example: What is the annual payment required to amortize (pay-off) a 985 loan over a period of 5 years at an annual interest rate of 8-1/2%.

Factor (Col. #6, 5 yrs.) .253766
 from $\frac{.085}{1.0-.665045} = .253766$
 Table:

Also by sinking fund plus interest:

$.168766 + .085 = .253766$

$PV_0 \times \left(\frac{A}{P, 8\frac{1}{2}\%, 5yrs.} \right) = A$

Answer: $985 * .253766 = 249.96$

Proof:	985	818.77	638.40	442.70	230.37
	<u>*.085</u>	<u>*.085</u>	<u>*.085</u>	<u>*.085</u>	<u>*.085</u>
	-83.72	-69.60	-54.26	-37.63	-19.58
	<u>249.96</u>	<u>249.96</u>	<u>249.96</u>	<u>249.96</u>	<u>249.96</u>
	166.23	180.36	195.69	212.33	230.37

EXAMPLE PROBLEMS

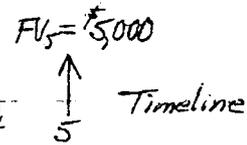
Here you have the sum total of what is known as Present Value Calculations as they relate to real estate.

Problem #1

Present Value of "Lump Sum" in the future.

Given:

Reversion value of property in future is \$5000.
5 year term.
6% interest rate.



Question:

What is the present value of this property?

Calculation:

$$FV_5 \times (P/F, 6\%, 5\text{ yrs}) = PV_0$$

$$5000 * .7473 = 3736.50$$

Because we are asking for today's value of a future amount at a given interest rate we simply locate in the Present Worth Table the factor for 6% at 5 years, i.e. .7473.

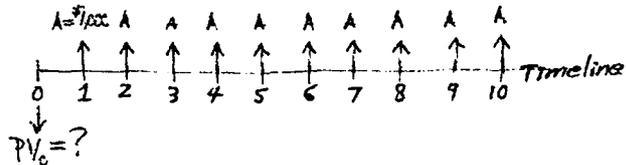
We have discounted the \$5000 amount back to today's value, using the 6% rate.

Problem #2

Present value of an income stream.

Given:

\$1000 income per year.
10 year term.
7% interest rate.



Question:

What is the present value of this income stream today?

Calculation:

$$A \times (P/A, 7\%, 10\text{ yrs}) = PV_0$$

$$1000 * 7.024 = 7024$$

This means that a constant income of \$1000 for 10 years is worth 7024 today if the best rate of interest is 7% per year. The difference between the total monies received (10,000) and the Present Value of these monies, 7024, is the interest (2976) which could be earned on the 7024.

Given:

\$2000 income per year.
20 year term.
7% interest rate.

Question:

What is the present value of this income stream today? OR How much is the income stream worth in a lump sum today?

Calculation:

$$2000 * 10.594 = 21,188$$

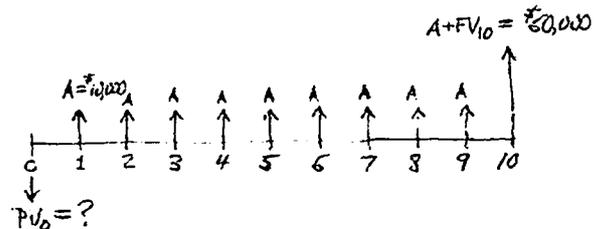
Today this income stream is worth 21,188. Note that this amount is much different then the total income (2000 per year * 20 years = 40,000). This is the effect of the compounding at 7% interest.

Problem #3

Present Value of a stream and reversion.

Given:

10,000 income for 10 years.
50,000 reversion at end of 10 years.
8% interest rate.



Question:

What is the total value of this project today?

Calculation:

Here we have two items of value and we must calculate the value for both.

↙ Rather than compute these two PV's separately, try solving for the total present value directly (ie, as one equation).

A. Income Stream		Total Value today:	67,100
10,000 * 6.710 = 67,100			23,160
$A \times (P/A, 8\%, 10\text{yrs}) = PV_0 \text{ of Income Stream}$			90,260
B. Reversion			
50,000 * .4632 = 23,160			
$FV_{10} \times (P/F, 8\%, 10\text{yrs}) = PV_0 \text{ of Reversion}$			

$$PV_0 = A (P/A, 8\%, 10\text{yrs}) + FV_{10} (P/F, 8\%, 10\text{yrs})$$

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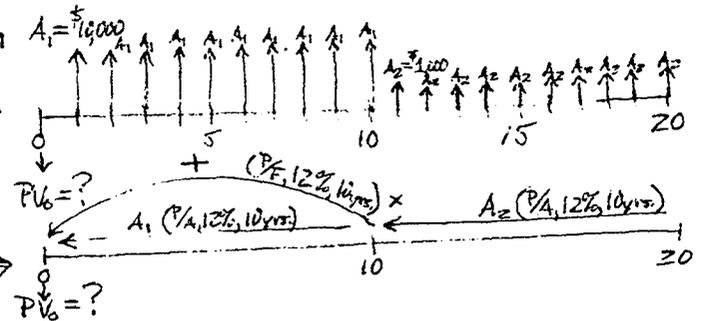
Problem #4

Present Value of a variable stream

Given:

- 10,000 income for years 1 to 10
- 1,000 income for years 11 to 20
- 12% interest for all years

Timeline \Rightarrow



Question:

Solution Conceptually \Rightarrow

What is the present value of this income stream?

Calculations:

Solution Formula \Rightarrow

$$PV_0 = A_1 (P/A, 12\%, 10 \text{ yrs.}) + A_2 (P/A, 12\%, 10 \text{ yrs.}) (P/F, 12\%, 10 \text{ yrs.})$$

10,000 * 5.650 = \$56,500.

1,000 * 5.650 = \$5,650. *Try to solve this?*

So far so good, but because the 1,000 per year income is for a 10 year period but for years 11 to 20 this amount 5650 must be discounted back to year 1 by adjusting with a Present Value such that the \$5650 earned in years 11 to 20 is worth 5650 * .3220 = \$1819. today. Today's Value is

a.	10,000 * 5.650	=	1-10	56,500
b.	1,000 * 5.650	=	5650. 11-20	
c.	5650 * .3220	=		1,819
				58,319
	Total			

* * *

Take special note of the way the income in years 11-20 was processed this is very important.

Given:

- 2000 income for years 1 to 10
- 4000 income for years 11 to 20
- 5000 income for years 21 to 30
- All at a 10% interest rate

Question:

What is the present value of this income stream.

Calculations:

a.	Yrs. 1-10	2000 * 6.145	=	12,290
b.	Yrs. 11-20	4000 * 6.145	=	24,580
	adj. to yr. 1	= 24,580 * .3855	=	9,475
c.	Yrs. 21-30	5000 * 6.145	=	30,725
	adj. to yr. 1	= 30,725 * .1486	=	4,565
	Total Value Today			26,330

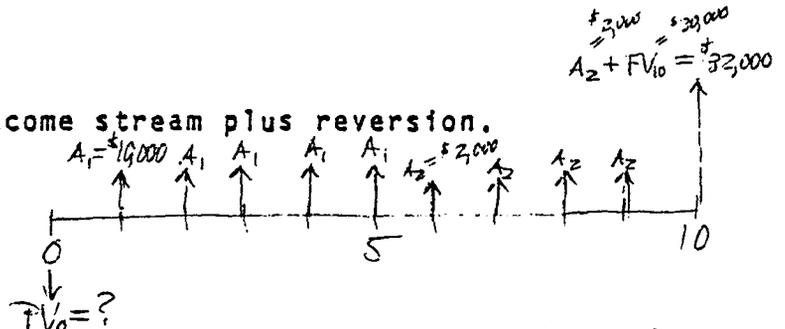
Note that the adjustment for years 11-20 was .3855 this is equal to discounting the dollar amount back to today from 10 years in the future. The adjustment for years 21-30 was .1486 because even though the interest rate was the same i.e. 10% the number of years had changed from 10 years in the future to 20. Thus the different adjustment.

Problem 5

Present Value of variable income stream plus reversion.

Given:

- 10,000 income years 1-5
- 2,000 income years 6-10
- 30,000 reversion year 10
- 6% interest rate



Question: Solution Formula $\Rightarrow PV_0 = A_1 \left(\frac{P}{A}, 6\%, 5 \text{ yrs} \right) + A_2 \left(\frac{P}{A}, 6\%, 5 \text{ yrs} \right) \left(\frac{P}{F}, 6\%, 5 \text{ yrs} \right) + FV_{10} \left(\frac{P}{F}, 6\%, 10 \text{ yrs} \right)$
 $PV_0 = \$10,000 () + \$2,000 () + \$30,000 ()$

What is the present value of this property?

Calculations:

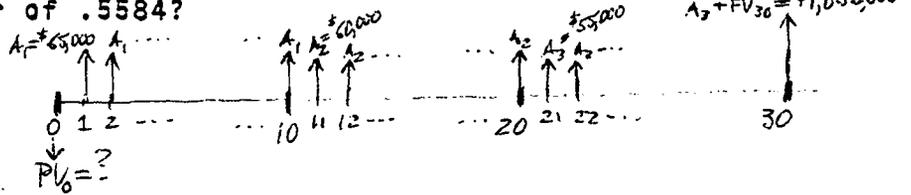
a.	1-5	=	10,000 * 4.212	=	42120.
b.	6-10	=	2,000 * 4.212	=	8424
	adj to 1	=	8424 * .7473	=	6295.
c.	Reversion	=	30,000 * .5584	=	<u>16752</u>
	Today's Value				\$65,167

Why adjust years 6-10 with a factor of .7473 while the reversion is adjusted with a factor of .5584?



Given:

- 65,000 for years 1-10
- 60,000 " " 11-20
- 55,000 " " 21-30
- 1,000,000 reversion at year 30
- All at 12% interest rate



Question: Solution Formula $\Rightarrow PV_0 = A_1 \left(\frac{P}{A}, 12\%, 10 \text{ yrs} \right) + A_2 \left(\frac{P}{A}, 12\%, 10 \text{ yrs} \right) \left(\frac{P}{F}, 12\%, 10 \text{ yrs} \right) + A_3 \left(\frac{P}{A}, 12\%, 10 \text{ yrs} \right) \left(\frac{P}{F}, 12\%, 10 \text{ yrs} \right) + FV_{30} \left(\frac{P}{F}, 12\%, 30 \text{ yrs} \right)$
 $PV_0 = \$65,000 () + \$60,000 () + \$55,000 () + \$1,000,000 ()$

What is the present value of this project

Calculations:

a.	1-10	=	65,000 * 5.650	=	367250.
b.	11-20	=	60,000 * 5.650	=	339000
			339000 * .3220	=	109158.
c.	21-30	=	55,000 * 5.650	=	310750
			310750 * .1037	=	32,224
d.	reversion	=	1,000,000 * .0334	=	<u>33,400</u>

Today's Value **\$542,032.00**

UNIVERSITY OF WISCONSIN
Real Estate Investment Teaching Model
Demonstration Case Study #2

ANALYSIS FOR PURCHASE OF APARTMENT HOUSE INVESTMENT

1. Assume you wish to analyze the investment value at alternative purchase prices of a 24 unit apartment building, located at 2575 University Avenue, Madison, Wisconsin. The building has twelve two-bedroom apartments that each rent furnished for \$140 per month and twelve one-bedroom apartments that rent each for \$125 per month. The building is five years old, unfurnished, in need of maintenance and available as is for about \$225,000.
2. The building is well located and vacant land in the area is selling for about \$1700 per unit. This means that \$40,000 of the purchase price could be designated as land value. In addition to the land and building, the purchase price could be allocated to include \$12,500 for the elevator and \$7,200 to the parking stalls.
3. Market analysis indicates that the building would rent very well if all the units were carpeted and furnished. For this work it is estimated that it would cost \$600 per two-bedroom unit and \$500 for each one-bedroom unit or a total investment of \$13,200 by the prospective buyer.
4. The total capital expenditures could be allocated for depreciation purposes as follows, keeping in mind that the prospect would be a second user and therefore only entitled to a maximum of 125% declining balance except for his new investment in furnishing. The percent depreciable and the number of years of remaining useful life are reasonable estimates given some knowledge of the practices of the Internal Revenue Service and the condition of the building:

Land	\$40,000			no depreciation allowed
Parking	7,200	50%	10 yrs.	125%
Elevator	12,500	90%	12 yrs.	125%
Building	165,300	100%	35 yrs.	125%
Furnishings	13,200	100%	7 yrs.	sum of digits
Transaction costs	1,800	100%	35 yrs.	125%

5. After completion of repairs and refurbishing it is anticipated that the two-bedroom apartments will rent for \$170 a month and the one-bedrooms \$150 per month. The gross rent roll of the building would then be:

$$\$170 \times 12 \times 12 = 24,480$$

$$\$150 \times 12 \times 12 = 21,600$$

$$\underline{\$ 46,080}$$

6. During the first year of changeover in ownership, refurbishing and re-leasing you estimate that each unit will be vacant about two months, that is about one-sixth of the time, (i.e. a vacancy of 17%) so that your average occupancy will

APARTMENT CASE STUDY #2

- be 83% of potential for the first year. Thereafter you anticipate a normal vacancy rate of 5%, or an occupancy of 95%. Thus first year extra expenses include an additional 12% of future gross for rental losses.
7. The current real estate and personal property taxes to be paid in the first year following purchase are estimated to be \$9,000. The normal current operating expenses, excluding real estate taxes but including management fees, are determined to be \$8,400.
 8. The property has been poorly maintained and will require additional expenditures of \$2100 in the first year to justify the new rent schedule. This deferred maintenance charge will be added to the extra operating expenses of the first year washing it out as a tax deductible expense.
 9. The buyer is considering this property because his accountant suggested that with his 30% tax bracket, including state and federal taxes, he should look for some tax shelter to offset some of his other current income. Using the accelerated method of depreciation, this real estate project should satisfy this requirement.
 10. The investor feels that while the normal ratio of market value to income in his community ranges between 8% and 11%, proper financing should raise the pre-tax yield on his cash equity to at least 18%. The accountant suggests that if the investor considers the cash saved on deferred income taxes due to depreciation, the investor should seek at least 18% to 22% on his investment annually on an after-tax basis. His opportunity cost is 12% as that is his common stock return including capital gains.
 11. The financing available to the investor would initially combine the assumption of a first mortgage with a balance of \$180,000 with 240 months to run and a second mortgage taken back by the seller to be repaid in ten years, in monthly payments. The investor would plan to refinance both loans at the end of the sixth year of ownership when the prepayment penalty would lapse on the first mortgage. The seller feels he should receive \$1000 as points on the second mortgage since that is the discount he will take when he sells the note.

1st Mortgage	180,000	20 year	7 3/4%	
			5 year balloon	
Private loan	15,000	10 year	8 1/2%	\$1000 discount
			5 year balloon	
 12. While the seller will pay for title insurance, a survey, and related items the buyer expects to pay about \$800 in professional appraisal and legal fees related to this transaction. These fees plus points in #11 equal transaction costs of \$1800 which increase original cash required and must be amortized over life of structure.
 13. Temporary cash deficits at the end of any month can be covered with bank notes at a rate of 9% per annum and repaid out of positive cash flows when available.

APARTMENT CASE STUDY #2

14. The financial plan is to maintain a highly leveraged position and therefore payoff the original loans at the end of the fifth year by obtaining a new mortgage. To discover some measure of influence of such refinancing on yield to equity and cash flows, the investor will assume that in five years the best loan he could obtain would equal \$190,000 for 20 year term at 8% interest. The age of the building at that time would require granting a bonus interest feature equal to 4% of gross rent as of the beginning of sixth year when the loan begins.



UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS

Real Estate Investment Teaching Model

February, 1971

Gross Rent Expenses Rental Growth Rate Expense Growth Rate

Card Type 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	
																						46080											8400											.0200											.0200										

R E Taxes R E Tax Growth Rate Project Value Rate of Growth

Card Type 6

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
																																9000											.0500											.0100										

Vacancy Rate Working Capital Loan Interest Rate

Card Type 7

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
																																								.0500											.0900													

To code Depreciation Method, use the following code no's.

- 0 = no depreciation
- 1 = sum of the digits
- 2 = straight line depreciation
- 3 = 125% declining balance
- 4 = 150% declining balance
- 5 = 200% declining balance

HAVE YOU CHECKED CARD 1 COLS. 61 and 64?

UNIVERSITY OF WISCONSIN SCHOOL OF BUSINESS
 Real Estate Investment Teaching Model
 February, 1971
 Basic Definitions of Model Outputs

- 1) Current period return on Net Worth before taxes =

$$\frac{\text{Cash Throw-off} + \text{Change in Net Worth}}{\text{Net Worth at End of Previous Year}}$$

- 2) Current period return on net worth after taxes =

$$\frac{\text{Spendable cash} + \text{tax savings on other income} + \text{(Change in net worth - change in cap. gains tax)}}{\text{Net worth at the end of previous year less capital gains tax of previous year}}$$

- 3) Cash return on original cash equity before taxes =

$$\frac{\text{Cash throw-off}}{\text{Total initial investment less initial mortgage debt}} \\ \text{(This is adjusted for staged projects)}$$

- 4) Cash return on original equity cash after taxes =
 (This is adjusted for staged projects)

$$\frac{\text{Spendable Cash after taxes} + \text{Tax savings on other income}}{\text{Total initial investment cost less initial mtge. debt}}$$

- 5) Net income - market value ratio

$$\frac{\text{Net Income}}{\text{Market Value for the same period}}$$

- 6) After tax cash recovered - cash equity ratio (payback) =

$$\frac{\text{Accumulated spendable cash after taxes} + \text{accumulated tax savings}}{\text{Cash equity required}} \\ \text{other income}$$

- 7) Default ratio =

$$\frac{\text{Operating Exp.} + \text{R.E. Taxes} + \text{Prin. \& Interest on Mtge.} + \text{Working Cap. Loan Prin. Repayment}}{\text{Gross Income}}$$

8) Lender Bonus Interest Rate =

$$\frac{\% \text{ of effective gross (not to exceed cash throw-off for period)}}{\text{Balance due on loan at beginning of period}}$$

9) Resale Market Value at End of Year

$$\text{Total Initial Investment Cost} + \text{Additional Staged Investment} \times \text{Index for Year}$$

10) Net worth of property =

$$\text{Market value less balance of loans less working capital loans}$$

11) A. Sales proceeds subject to capital gains tax =

$$\text{Market value} - (\text{Total Capital Investment} - \text{Straight-line depreciation} - \text{Allowed excess depreciation})$$

B. Sales proceeds subject to income tax =

$$\text{Cumulative depreciation taken} - \text{Straight-line depreciation} - \text{Allowed excess depreciation}$$

$$\text{C. Taxes on sale} = (A \times 1/2 \text{ Income Tax rate}^*) + (B \times \text{Income Tax Rate})$$

* Not to exceed 25%

12) Present value of project before taxes =

$$\text{Original mortgage balance} + \text{PV of received stream of cash throw-off} + \text{PV of net worth if sold at end of year indicated by column number.}$$

13) Present value of project after taxes =

$$\text{Original mortgage balance} + \text{present value of received stream of spendable cash after taxes} + \text{PV of received tax savings on other income} + \text{PV of (net worth less capital gains tax) if sold at end of year indicated by column number.}$$

14) Cash Equity Required = \sum \$ components utilized -

$$\sum \text{face value of mortgages in force}$$

15) For each year N (net worth - cap gains tax) +

$$X = \sum_{t=1}^N \left[(\text{Spendable Cash Aft Taxes} + \text{Tax Savings}) * (1. + \text{Cost of Equity Cap})^{N-t} \right]$$

$$Y = (\text{LOG}(X) - \text{LOG}(\text{Original Investment})) / N$$

$$\text{Equity Rate} = \text{Exp}(Y) - 1.$$

COMPONENTS	PCT. DEPR	BEGIN USE	USEFUL LIFE	DEPR METHOD	COST	GROSS RENT	EXPENSES	R E TAXES	INCOME TAX RATE	VACANCY RATE	EQUITY DISCOUNT RATE	STAGING YR(01,FACTOR	RATE OF GROWTH OF GROSS RENT	RATE OF GROWTH OF EXPENSES	RATE OF GROWTH OF R E TAXES	RATE OF GROWTH OF PROJECT VALUE	WORKING CAPITAL LOAN RATE	EXTRAORDINARY EXPENSES	COST OF EQUITY CAPITAL
LAND	.00	1	.	0	\$ 40000.	\$ 46080.	\$ 8400.	\$ 9000.	.3000	.0500	.1800	.00	.0200	.0200	.0500	.0100	.0900	\$ 7625.	.1200
BUILDING	1.00	1	35.	3	\$ 165300.														
ELEVATOR	.80	1	9.	3	\$ 12500.														
FURNISHINGS	1.00	1	7.	5	\$ 13200.														
PARKING	.50	1	10.	3	\$ 7200.														
TRANSACTION COST	1.00	1	35.	3	\$ 1800.														
7TH YR REFURBISH	1.00	8	7.	1	\$ 10000.														
TOTAL INITIAL INVESTMENT					\$ 240000.														

	1	2	3	4	5	6	7	8	9	10
CASH EQUITY REQUIRED	45000.	45000.	45000.	45000.	45000.	50000.	50000.	50000.	50000.	50000.

FINANCING PLAN

FIRST ASSUMED MORTG \$ 180000.											
	1	2	3	4	5	6	7	8	9	10	
MONTHLY PAYMENT \$	1477.										
INTEREST RATE	.0775										
STARTS	1										
ENDS	5										
BONUS											
INTEREST	.0000										
OF GROSS RENT											
PRINCIPAL	3919.	4234.	4574.	4942.	5339.	.	.	.	.	.
INTEREST	13812.	13497.	13157.	12790.	12393.	.	.	.	.	.
BALANCE	176080.	171845.	167270.	162328.	156989.	.	.	.	.	.

SELLERS 2ND MORTG. \$ 15000.											
	1	2	3	4	5	6	7	8	9	10	
MONTHLY PAYMENT \$	185.										
INTEREST RATE	.0850										
STARTS	1										
ENDS	6										
BONUS											
INTEREST	.0000										
OF GROSS RENT											
PRINCIPAL	994.	1082.	1178.	1282.	1396.	.	.	.	.	.
INTEREST	1236.	1148.	1053.	948.	835.	.	.	.	.	.
BALANCE	14005.	12922.	11743.	10460.	9064.	.	.	.	.	.

REFINANCED FIRST \$ 190000.											
	1	2	3	4	5	6	7	8	9	10	
MONTHLY PAYMENT \$	1589.										
INTEREST RATE	.0800										
STARTS	6										
ENDS	10										
BONUS											
INTEREST	.0400										
OF GROSS RENT											
PRINCIPAL	.	.	.	.	.	4016.	4349.	4710.	5101.	5524.
INTEREST	.	.	.	.	.	15054.	14721.	14360.	13969.	13546.
BALANCE	.	.	.	.	.	185983.	181634.	176924.	171822.	166297.

REFURBISH CHATTEL \$ 10000.											
	1	2	3	4	5	6	7	8	9	10	
MONTHLY PAYMENT \$	150.										
INTEREST RATE	.0900										
STARTS	8										
ENDS	10										
BONUS											
INTEREST	.0000										
OF GROSS RENT											
PRINCIPAL	.	.	.	.	.	.	.	938.	1026.	1122.
INTEREST	.	.	.	.	.	.	.	861.	773.	677.
BALANCE	.	.	.	.	.	.	.	9061.	8035.	6913.

	1	2	3	4	5	6	7	8	9	10
GROSS RENT	46080.	47001.	47923.	48844.	49766.	50688.	51609.	52531.	53452.	54374.
LESS VACANCY ALLOWANCE	2304.	2350.	2396.	2442.	2488.	2534.	2580.	2626.	2672.	2718.
EFFECTIVE GROSS INCOME	43776.	44651.	45527.	46402.	47278.	48153.	49029.	49904.	50780.	51655.
LESS REAL ESTATE TAXES	9000.	9450.	9900.	10350.	10800.	11250.	11700.	12150.	12600.	13050.
LESS EXPENSES	16025.	8568.	8736.	8904.	9072.	9240.	9408.	9576.	9744.	9912.
NET INCOME	18751.	26633.	26891.	27148.	27406.	27663.	27921.	28178.	28436.	28693.
LESS DEPRECIATION	11578.	10038.	8847.	7913.	7169.	6565.	6067.	7790.	7178.	6223.
LESS INTEREST	15049.	14646.	14210.	13739.	13229.	17082.	16785.	17323.	16881.	16398.
TAXABLE INCOME	-7876.	1948.	3832.	5495.	7007.	4015.	5068.	3064.	4375.	6071.
PLUS DEPRECIATION	11578.	10038.	8847.	7913.	7169.	6565.	6067.	7790.	7178.	6223.
LESS PRINCIPAL PAYMENTS	4914.	5317.	5753.	6224.	6735.	4016.	4349.	5648.	6127.	6647.
CASH THROW-OFF	-1213.	6669.	6926.	7184.	7441.	30510.	6785.	15206.	5427.	5647.
LESS TAXES	.	584.	1149.	1648.	2102.	1204.	1520.	919.	1312.	1821.
CASH FROM OPERATIONS	-1213.	6084.	5777.	5535.	5339.	29306.	5265.	14287.	4114.	3826.
WORKING CAPITAL LOAN(CUM BALANCE)	1213.	.	.	.	.	.	.	.	.	.
SPENDABLE CASH AFTER TAXES	.	4762.	5777.	5535.	5339.	29306.	5265.	4287.	4114.	3826.
TAX SAVINGS ON OTHER INCOME	2363.	.	.	.	.	.	.	.	.	.
* * * * *										
MARKET VALUE	240000.	242400.	244800.	247200.	249600.	252000.	254400.	266800.	269200.	271600.
BALANCE OF LOANS	191298.	184767.	179014.	172789.	166054.	185983.	181634.	185985.	179858.	173211.
NET WORTH OF PROPERTY	48701.	57632.	65785.	74410.	83545.	66016.	72765.	80814.	89341.	98388.
CAPITAL GAIN	8131.	18662.	29193.	39724.	50255.	60786.	71317.	83277.	95046.	106605.
CAPITAL GAINS TAX	1219.	2799.	4378.	5958.	7538.	9117.	10697.	12491.	14256.	15990.
INCOME TAX ON EXCESS DEPRECIATION	1034.	1606.	1821.	1756.	1467.	997.	378.	.	.	.
* * * * *										
PERCENT INITIAL EQUITY PAYBACK AFTER TAX	.0525	.1583	.2867	.4097	.5283	1.0616	1.1669	1.2527	1.3350	1.4115
NET INCOME-MARKET VALUE RATIO	.0781	.1098	.1098	.1098	.1098	.1097	.1097	.1056	.1056	.1056
RETURN ON NET WORTH BEFORE TAXES	.0552	.3203	.2616	.2403	.2227	.1553	.2050	.3195	.1726	.1644
RETURN ON NET WORTH AFTER TAXES	.0846	.2484	.2280	.2122	.1976	.1430	.1977	.1770	.1591	.1483
CASH RETURN ON ORIG CASH EQUITY BEF TAX	-.0269	.1482	.1539	.1596	.1653	.6102	.1357	.3041	.1085	.1129
CASH RETURN ON ORIG CASH EQUITY AFT TAX	.0525	.1058	.1283	.1230	.1186	.5861	.1053	.0857	.0822	.0765
DEFAULT RATIO	.9763	.8333	.8054	.8029	.8004	.8204	.8185	.8508	.8484	.8461
LENDER BONUS INTEREST RATE	.0000	.0000	.0000	.0000	.0000	.0122	.0110	.0115	.0114	.0120
* * * * *										
PRESENT VALUE OF PROJECT BEFORE TAXES	236272.	241180.	244044.	246091.	247482.	246720.	247239.	254941.	254808.	254543.
PRESENT VALUE OF PROJECT AFTER TAXES	236364.	238649.	240204.	241194.	241709.	240691.	241002.	245953.	245633.	245179.
EQUITY RATE W/ COST OF CAPITAL AT .120	.0846	.1607	.1785	.1825	.1817	.1741	.1716	.1683	.1648	.1615

BUSINESS 550/705
THE REAL ESTATE PROCESS

Cash Flow Handout #2

Given:

- a. Investor equity rate = 13%
- b. Income
 - 1. years 1 - 10 = \$60,000 per year
 - 2. years 11 - 20 = 65,000 per year
 - 3. years 21 - 30 = 90,000 per year
- c. Reversion value = \$600,000

Question

What is the most that this investor should pay for this project with 100% equity money?

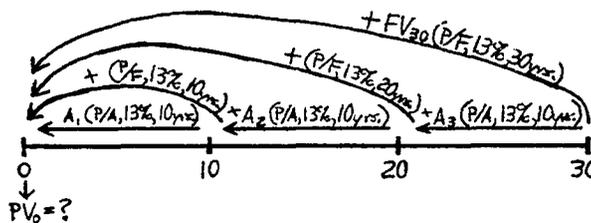
Calculations

$$PV_0 = A_1(P/A, 13\%, 10\text{yrs.}) + A_2(P/A, 13\%, 10\text{yrs.})(P/F, 13\%, 10\text{yrs.}) \\ + A_3(P/A, 13\%, 10\text{yrs.})(P/F, 13\%, 20\text{yrs.}) + FV_{30}(P/F, 13\%, 30\text{yrs.})$$

$$PV_0 = \$60,000(5.42624) + \$65,000(5.42624)(.29459) \\ + \$90,000(5.42624)(.08678) + \$600,000(.02557)$$

$$PV_0 = \underline{\underline{\$487,200}} \quad \text{-- This is the present value of the cash flows to the equity investor if 100% equity is used to finance the purchase (i.e., no debt).}$$

Solution Conceptually:



Given:

- A. Bank financing
Repayment = \$50,000 per year
Interest = 10%
Term = 20 years
- B. Insurance Co. financing
Repayment = \$40,000 per year
Interest = 9%
Term = 25 years

Question

Compare these two financing packages.

Calculations

A. Bank financing

$$\begin{aligned}\text{Step 1: PV of mortgage loan} &= \text{ADS}(\text{P/A}, 10\%, 20\text{yrs.}) \\ &= \$50,000 (8.51356) \\ &= \underline{\underline{\$425,678}}\end{aligned}$$

Step 2: PV of cash flows to equity investors:

$$\begin{aligned}\text{PV}_0 &= (\text{A}_1 - \text{ADS})(\text{P/A}, 13\%, 10\text{yrs.}) + (\text{A}_2 - \text{ADS})(\text{P/A}, 13\%, 10\text{yrs.}) \\ &\quad \times (\text{P/F}, 13\%, 10\text{yrs.}) \\ &\quad + (\text{A}_3 - \text{ADS})(\text{P/A}, 13\%, 10\text{yrs.}) (\text{P/F}, 13\%, 20\text{yrs.}) \\ &\quad + \text{FV}_{30}(\text{P/F}, 13\%, 30\text{yrs.}) \\ \text{PV}_0 &= (\$60,000 - \$50,000)(5.42624) \\ &\quad + (\$65,000 - \$50,000)(5.42624)(.29459) \\ &\quad + (\$90,000 - \$0)(5.42624)(.08678) \\ &\quad + \$600,000(.02557) \\ \text{PV}_0 &= \underline{\underline{\$135,962}}\end{aligned}$$

$$\begin{aligned}\text{Step 3: Investment value of project} &= \text{PV of loan} + \text{PV of equity} \\ &= \$425,678 + \$135,962 \\ &= \underline{\underline{\$561,640}}\end{aligned}$$

Remarks:

- Note that the lender discounts his(/her) cash flows at 10% in this example while the equity investor(s) discounts his cash flows at 13%. Always be careful that you are using the appropriate discount rate.
- At the end of 20 years in this example, the mortgage loan has been fully repaid; hence, no annual debt service (ADS) is deducted from the income during years 21 through 30.

Calculations (Cont'd)

B. Insurance Co. financing

$$\begin{aligned}\text{Step 1: PV of mortgage loan} &= \text{ADS}(P/A, 9\%, 25 \text{ yrs.}) \\ &= \$40,000 (9.82258) \\ &= \underline{\underline{\$392,903}}\end{aligned}$$

Step 2: PV of cash flows to equity investors:

$$\begin{aligned}PV_0 &= (A_1 - \text{ADS})(P/A, 13\%, 10\text{yrs.}) \\ &\quad + (A_2 - \text{ADS})(P/A, 13\%, 10\text{yrs.})(P/F, 13\%, 10\text{yrs.}) \\ &\quad + (A_3 - \text{ADS})(P/A, 13\%, 5\text{yrs.})(P/F, 13\%, 20\text{yrs.}) \\ &\quad + A_3(P/A, 13\%, 5\text{yrs.})(P/F, 13\%, 25\text{yrs.}) \\ &\quad + FV_{30}(P/F, 13\%, 30\text{yrs.}) \\ PV_0 &= (\$60,000 - \$40,000)(5.42624) \\ &\quad + (\$65,000 - \$40,000)(5.42624)(.29459) \\ &\quad + (\$90,000 - \$40,000)(3.51723)(.08678) \\ &\quad + \$90,000(3.51723)(.047102) \\ &\quad + \$600,000(.02557) \\ PV_0 &= \underline{\underline{\$194,001}}\end{aligned}$$

$$\begin{aligned}\text{Step 3: Investment value of project} &= \text{PV of loan} + \text{PV of equity} \\ &= \$392,903 + \$194,001 \\ &= \underline{\underline{\$586,904}}\end{aligned}$$

Comparison of financing packages

The insurance company financing package is more valuable since it produces a higher investment value for the project. This is due to the lower interest rate and the longer term of the loan. Note that the insurance company financing package involves a smaller mortgage loan, however.

FRONT DOOR/BACK DOOR DEMO PROBLEM

The purpose of this problem set is to demonstrate the two general approaches to value. The first approach is called the "FRONT DOOR" approach and represents the Capital Allocation form of real estate valuation. The "solution" of this approach is value of the investment to investors.

The second approach is called the "BACK DOOR" approach and represents the Revenue Justified (RJV) form of real estate valuation. The "solution" of this approach is the justified capital allocation costs. This is determined on a Before Tax Basis.

GIVEN INFORMATION

- I. Basic Building
 - Gross Area $60' \times 228' = 13,680$ S.F.
 $13,680 * 3$ floors = $41,040$ S.F.
 - Office Space on First Floor
 $26' * 228 = 2,964$ S.F.

- II. Revenue Units
 - A. Apartments
 1. 10 efficiency @ 400 S.F. = $4,000$ S.F.
 2. 30 one bedroom @ 650 S.F. = $19,500$ S.F.
 3. 10 two bedroom @ 925 S.F. = $9,250$ S.F.

Net Rentable Area-Apartments = $32,750$ S.F.

 - B. Office Space
Net Rentable Area-Office Space = $2,839$ S.F.

- III. Building Efficiencies
 - A. Apartments
$$\frac{32,750 \text{ S.F.}}{38,076 \text{ S.F. (} 41,040 - 2,964 \text{)}} = 86\%$$

 - B. Office Space
$$\frac{2,839 \text{ S.F.}}{2,964 \text{ S.F.}} = 96\%$$

 - C. Building Average
$$\frac{35,589 \text{ S.F.}}{41,040 \text{ S.F.}} = 87\%$$

- IV. Gross Income
 - A. Apartments
 1. Efficiency ($400 \text{ S.F.} * .475/\text{S.F.}$) = $190/\text{mo}/\text{unit}$
 $190/\text{unit} * 10$ units = $1,900/\text{mo.}$
 2. One bedroom ($650 \text{ S.F.} * .400/\text{S.F.}$) = $260/\text{mo}/\text{unit}$
 $260/\text{unit} * 30$ units = $7,800/\text{mo.}$
 3. Two bedroom ($925 \text{ S.F.} * .324/\text{S.F.}$) = $300/\text{mo}/\text{unit}$
 $300/\text{unit} * 10$ units = $3,000/\text{mo}$

Total Monthly Income-Apartments = $12,700$

4. Gross Income-Apartments		
12,700 * 12 months	=	152,400
5. Parking Income		
20 stalls @ 12.50/mo * 12 mo	=	3,000
6. Miscellaneous Income (washer & dryer)		
6.00/unit/mo * 50 units * 12 mo	=	3,600
7. Furniture Rental		
25.00/unit/mo * 10 units * 12 mo	=	3,000
Total Apartment Income	=	<u>162,000</u>
B. Office Space		
2,840 S.F. * 6.50/S.F./yr	=	18,460
Total Gross Income		<u>180,460</u>
V. Expenses		
A. Operating Expenses		
1. Utilities (.28/S.F.)*	=	9,170
2. Insurance (.04/S.F.)	=	1,424
3. Leasing Comm (8.00/unit/yr)	=	400
4. Payroll & Taxes (.18/S.F.)*	=	6,406
5. Management Fees (6% of gross)	=	10,827
6. Maintenance (.30/S.F.)	=	10,677
Total (25.55% gross)	=	<u>38,904</u>
*Apartment units only		
B. Real Estate Taxes		
(11.5% of gross)	=	20,753
Total Expenses	=	<u>59,657</u>
VI. Replacement Reserves (Sinking Fund Deposit @ 5.5%)		
A. Replacement of carpeting - 5 year life		
3911 Sq. Yd. @ 8.00/Sq. Yd. = 31,288		
31,288 * .179176	=	5,606
B. Replacement of A/C units - 7 year life		
50 units @ 485 ea. = 24,250		
24,250 * .120964	=	<u>2,933</u>
Total Reserves (4.73% gross)	=	<u>8,539</u>

VII. Vacancy Determination

A. Apartments

1. Efficiency	= 1 unit/month	
1 * 12 = 12 * 190/mo		= 2,280
2. One bedroom	= 1.75 unit/month	
1.75 * 12 = 21 * 260/mo		= 5,460
3. Two bedroom	= .5 unit/month	
.5 * 12 = 6 * 300/mo		= <u>1,800</u>
		<u>9,540</u>

4. Fixed Income Vacancy As A %

$$\frac{9,540}{152,400} = 6.26\%$$

5. Variable Income Vacancy As A Dollar Amount

$$.0626 * 9,600 = \underline{600}$$

$$\text{Total Apartment Vacancy Amount} = \underline{\underline{10,140}}$$

Total Apartment Vacancy

% of Gross Income

$$\frac{10,140}{180,460} = 5.62\%$$

B. Office Space

5 year triple net lease - no vacancy

VIII. Projected Costs

1. Land (36,000 S.F. @ 2.50/S.F.)	=	90,000
2. Building Shell & Mech. (24.56/S.F.)	=	1,007,943
3. Architects Fees (6% of building)	=	60,477
4. Accounting & Const. Mgnt. (3.5% of Building)	=	35,280
5. Parking Lot (8,000 S.F. @ .5 S.F.)	=	4,000
6. Washer & Dryer (5 sets @ 650 ea.)	=	3,250
7. Furnishings (10 units @ 1,150 ea.)*	=	11,500
8. Legal & Insurance	=	15,000
9. Promotion	=	5,000
Total Cost		<u><u>1,232,450</u></u>

*Furnishings

1. Hide-A-Bed	450
2. Dresser	200
3. 2 Chairs	300
4. 2 End Tables	100
5. Dinette	325
6. 2 Lamps	65
	<u>1,440</u>

$$1,440 * 20\% \text{ discount} = 1,152 = \underline{\underline{1,150}}$$

IX. Unit Costs - Less Land

$$1,232,450 - 90,000 = 1,142,450$$

A. Apartment Costs

$$1,142,450 * .9278^* = 1,059,965$$

$$\frac{1,059,965}{38,076} = 27.84/\text{S.F. Gross}$$

$$\frac{1,059,965}{32,750} = 32.37/\text{S.F. Net Rentable}$$

1. Efficiency	=	400 S.F. *	32.37	=	12,948
2. One bedroom	=	650 S.F. *	32.37	=	21,040
3. Two bedroom	=	925 S.F. *	32.37	=	29,942

B. Office Space

$$1,142,450 - 1,059,965 = 82,485$$

$$\frac{82,485}{2,964} = 27.83/\text{S.F. Gross}$$

$$\frac{82,485}{2,839} = 29.05/\text{S.F. Net Rentable}$$

X. Investment Assumptions

A. Mortgage

1. Loan-to-Value Ratio	=	80%
2. Interest Rate	=	9%
3. Term	=	30 years
4. Payments Per Year	=	12
5. Mortgage Constant	=	.096552
6. Default Ratio	=	85%

B. Investor

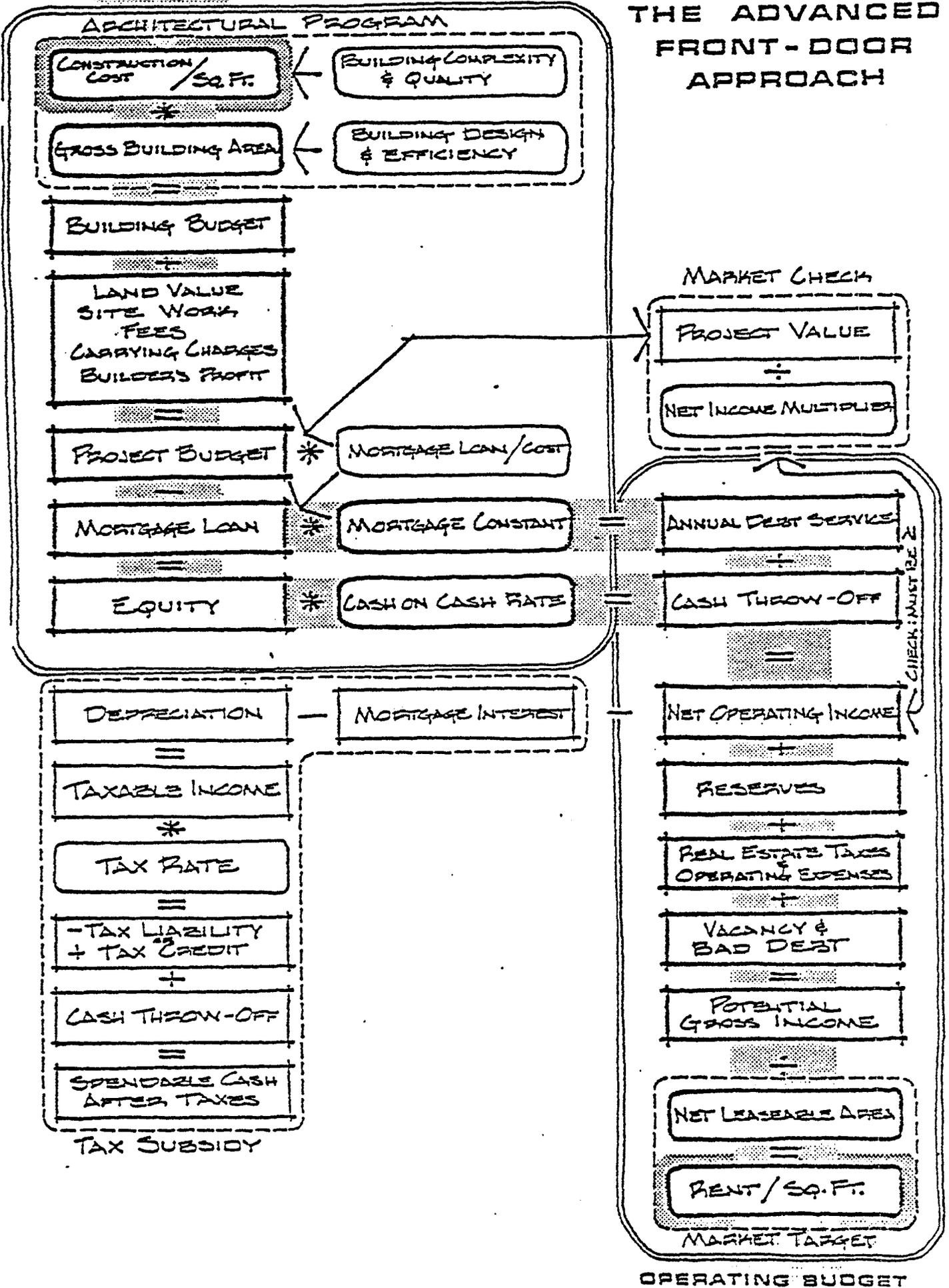
1. Maximum Equity	=	250,000
2. B/4 Tax Return	=	7.5%
3. Payback Year	=	7
4. Marginal Income Tax Rate	=	50%

C. Components

1. Depreciation Rate	=	200% D.D.B.
2. Annual Growth Rate	=	1.75%
3. Working Capital Loan Rate	=	13%

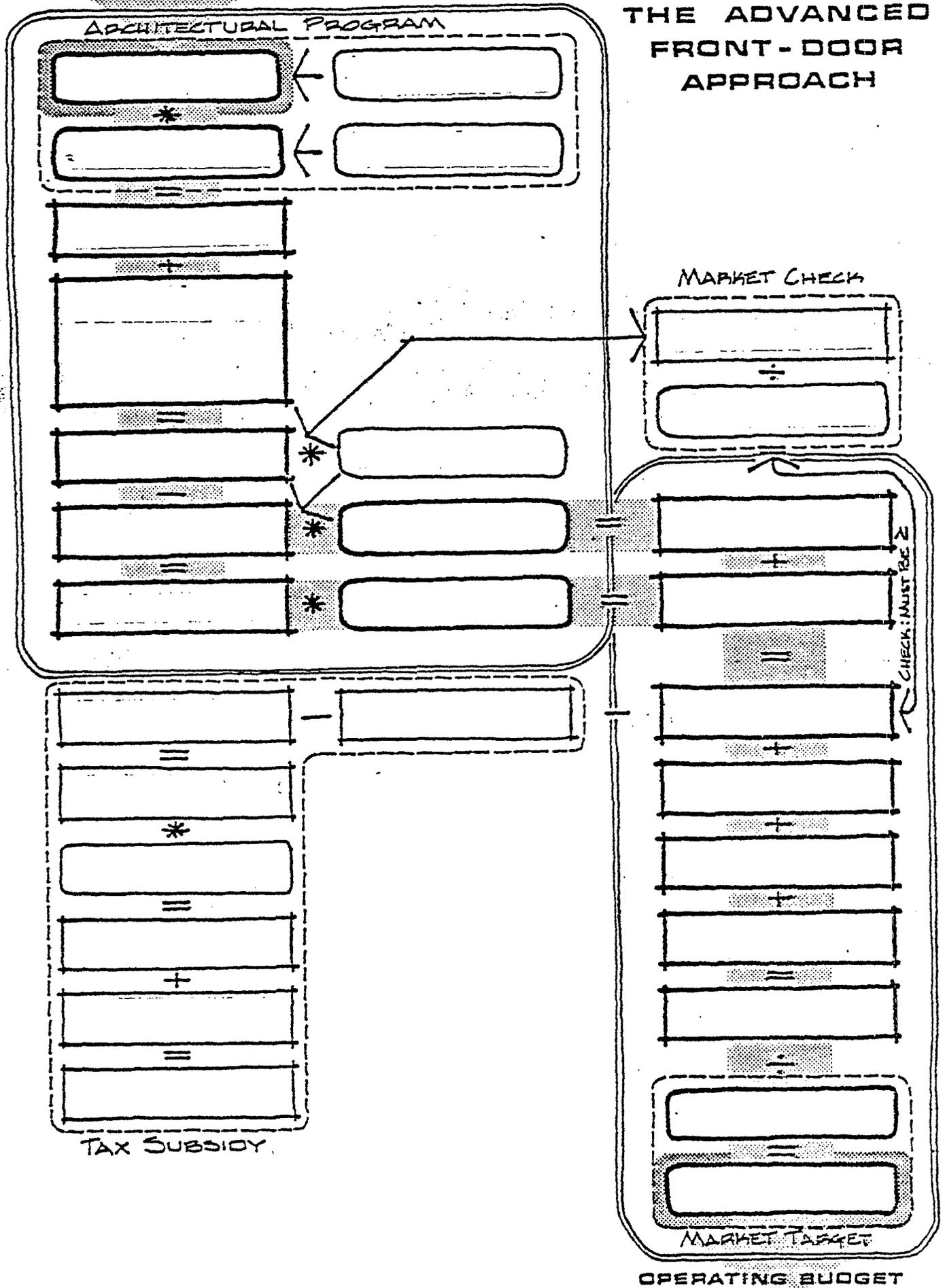
CAPITAL BUDGET

THE ADVANCED FRONT-DOOR APPROACH



CAPITAL BUDGET

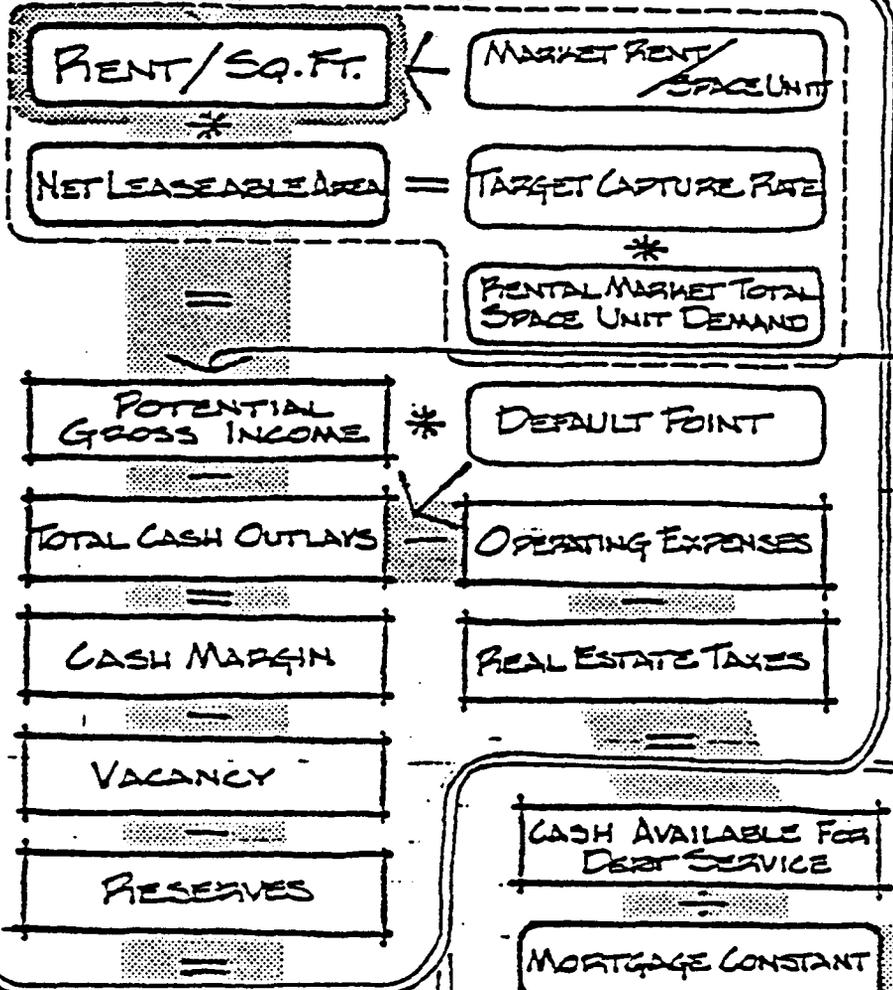
THE ADVANCED FRONT-DOOR APPROACH



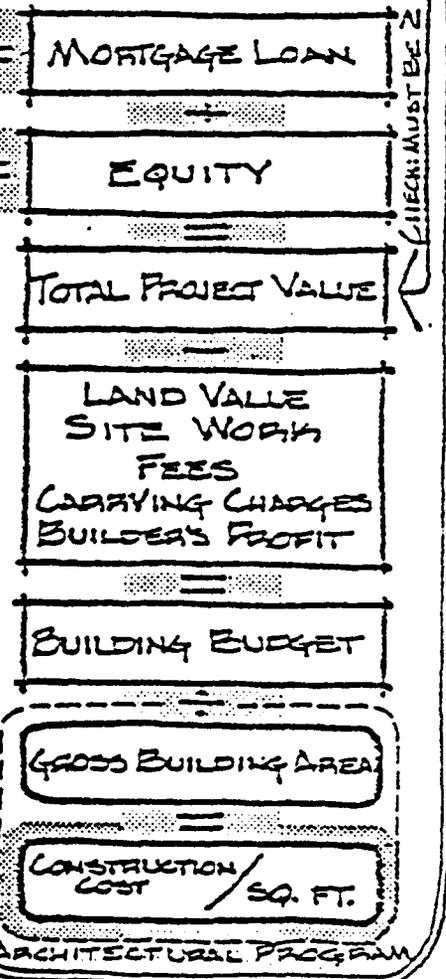
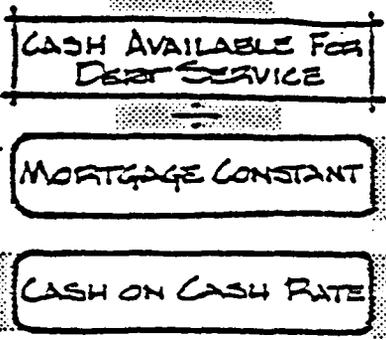
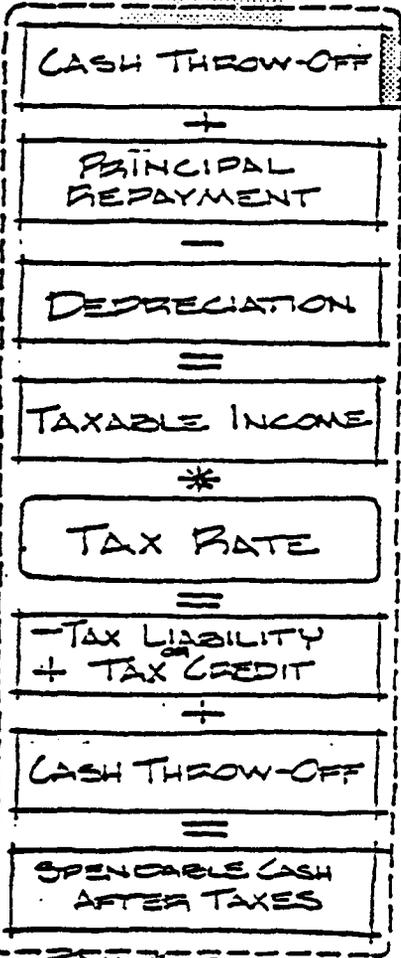
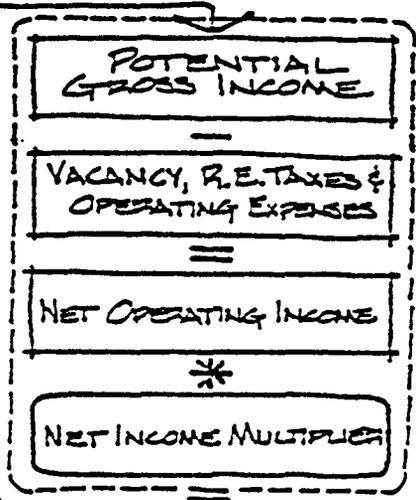
OPERATING BUDGET

THE ADVANCED
BACK-DOOR
APPROACH

MARKET SURVEY



MARKET CHECK



ARCHITECTURAL PROGRAM

CAPITAL BUDGET

OPERATING BUDGET

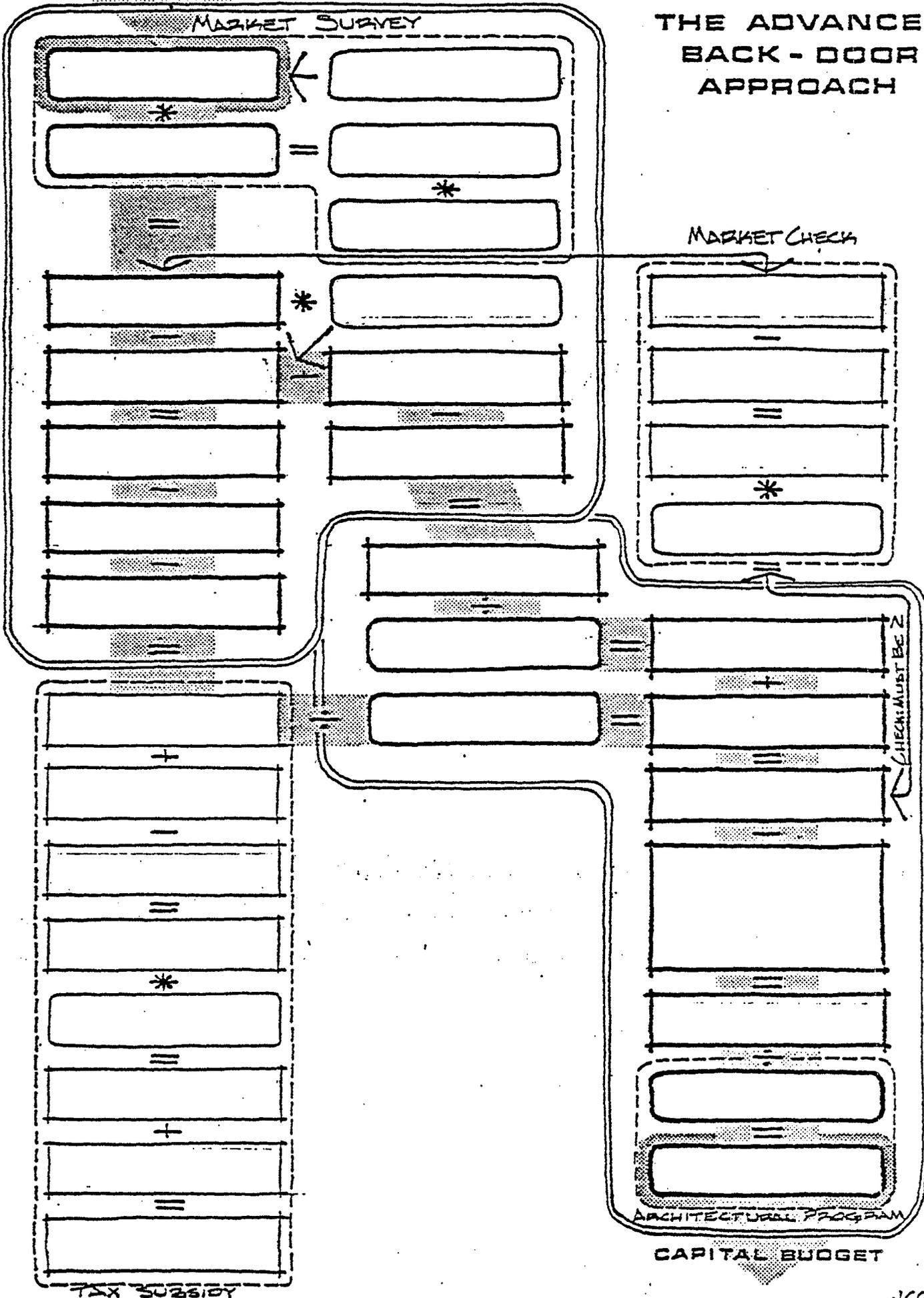
MARKET SURVEY

THE ADVANCED
BACK-DOOR
APPROACH

MARKET CHECK

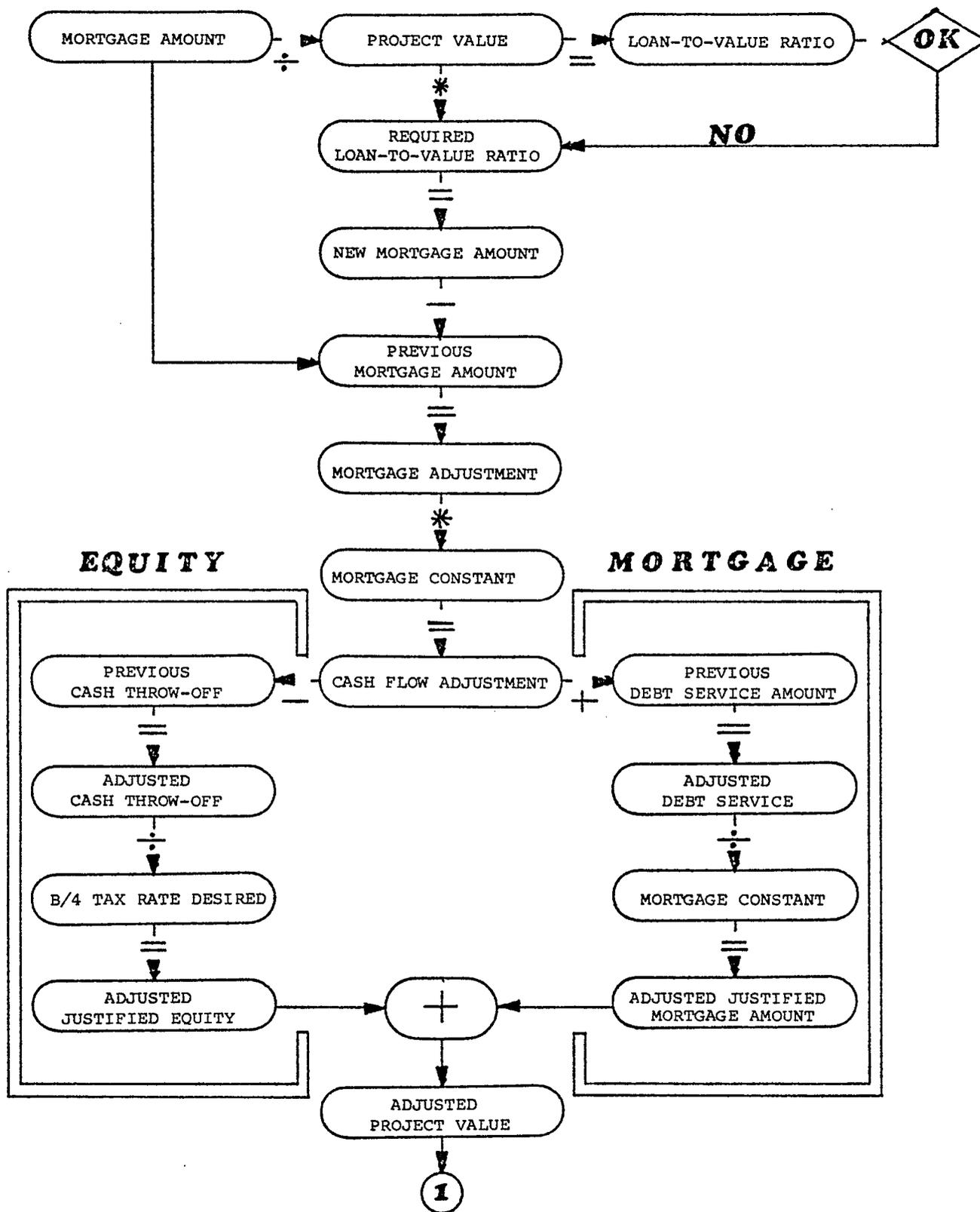
ARCHITECTURAL PROGRAM

CAPITAL BUDGET



TAX SUBSIDY

INVESTMENT VALUE



INVESTMENT VALUE

