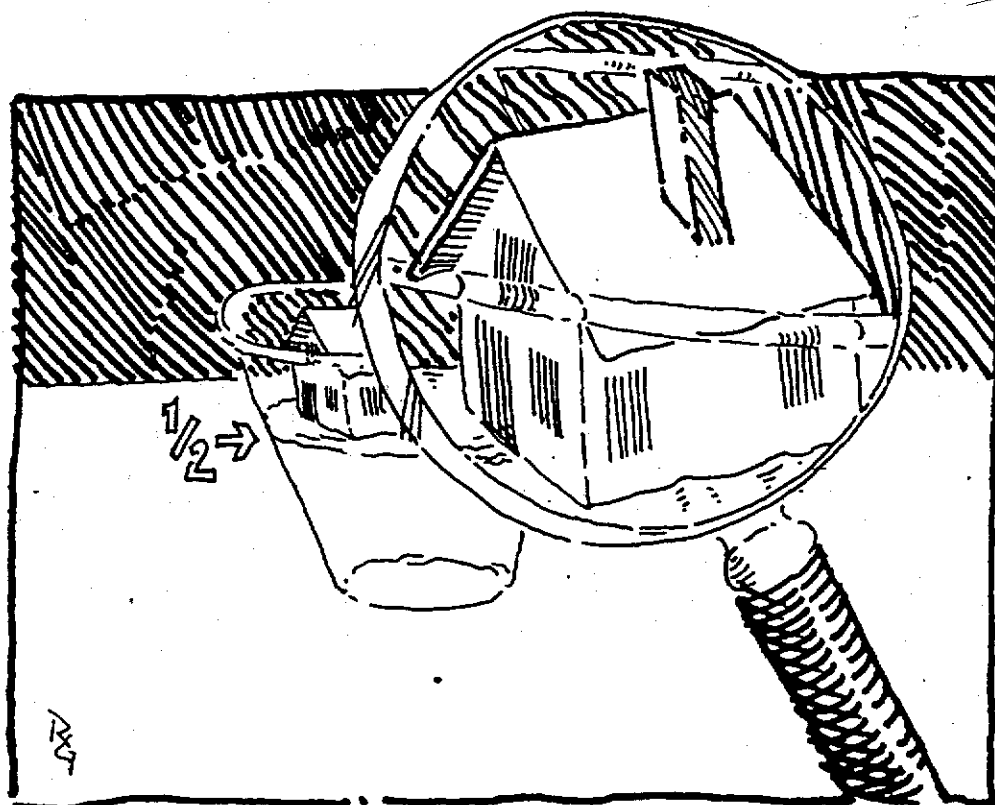


Optimistic projections from income-producing properties must be carefully scrutinized.

Nine Abuses Common in Pro Forma Cash Flow Projections

Vernon Martin III



THE ADVENT OF personal computers and software packages for real estate investment analysis has made it so simple for analysts to perform computerized analyses of cash flows from income-producing properties over multiyear holding periods that real estate proposals using these projections have proliferated. The final computer output appears authoritative and precise and gives the impression that it is the result of thorough analysis on a lease-by-lease basis. These computer analyses, replete with estimated cash flows and internal rates of return, are now common in applications for real estate loans and

in promotional packages from real estate brokers. Interestingly, these "computer analyses" never fail to justify asking prices or desired loan amounts.

THE MERITS AND DANGERS OF DISCOUNTED CASH FLOW ANALYSIS

One common feature of almost all cash flow projections is a discounted cash flow (DCF) analysis, preferably based on a lease-by-lease exami-

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EXHIBIT 1
TEN-YEAR PRO FORMA CASH FLOW PROJECTION
(in \$000)

	1	2	3	4	5	6	7	8	9	10	11
Base rental income	2,654	2,787	2,926	3,072	3,226	3,387	3,557	3,734	3,921	4,117	4,323
Expense recovery income	663	690	717	746	776	807	839	872	907	944	981
Gross potential income	3,317	3,477	3,643	3,818	4,002	4,194	4,396	4,606	4,828	5,061	5,304
Less: Rental concessions	(149)	(233)	(61)								
Less: Vacancy/collection loss	(606)	(174)	(182)	(191)	(200)	(210)	(220)	(230)	(241)	(253)	(265)
Effective gross income	2,562	3,070	3,400	3,627	3,802	3,984	4,176	4,376	4,587	4,808	5,039
Less: Expenses											
Management fee	(102)	(123)	(136)	(145)	(152)	(159)	(167)	(175)	(183)	(192)	(202)
Taxes	(126)	(129)	(132)	(134)	(137)	(140)	(142)	(145)	(148)	(151)	(154)
Insurance	(38)	(39)	(40)	(42)	(43)	(44)	(45)	(47)	(48)	(50)	(51)
Utilities	(585)	(608)	(633)	(658)	(684)	(712)	(740)	(770)	(801)	(833)	(866)
Other expenses	(287)	(298)	(310)	(323)	(336)	(349)	(363)	(378)	(393)	(408)	(425)
Total expenses	(1,138)	(1,197)	(1,251)	(1,302)	(1,352)	(1,404)	(1,457)	(1,515)	(1,573)	(1,634)	(1,698)
NOI	1,424	1,873	2,149	2,325	2,450	2,580	2,719	2,861	3,014	3,174	3,341

Reversion: $\$3,341,000 \div .085 = \$39,305,882$

-Closing costs (2%) (786,118)

Net sales proceeds \$38,519,765

Present value of reversion \$10,857,379

IRR = 13.5%

Present value of NOI \$12,105,174

IRR = 13%

Total present value \$33,963,553

Rounded to \$23,000,000

nation but often based on summary estimates of annual income by year, over a multiyear holding period. Lease-by-lease DCF analysis examines the cumulative flows from current leases and the expected flows from new leases executed under expected re-leasing conditions and shows the effect of these flows on a multiyear income stream. A present value of the income stream is computed by discounting cash flows according to an equity yield rate or internal rate of return (IRR) typically required by investors for similar properties. One of the reasons for the growing use of DCF analysis is the impressiveness of the presentation. Moreover, unstable markets have caused many to prefer multiyear DCF analysis over stabilized single-year capitalization.

Critics of DCF analysis decry the number of unverifiable assumptions that must be made in the course of a DCF analysis and the fact that the conclusions may be altered by manipulating variables and changing key assumptions such as growth rates and rates of return. Because computer technology has only recently made lease-by-lease analysis practical, many of the working analysts are recent college graduates who have little real estate experience. Without supervision, these young analysts are likely to produce unrealistic cash flow models. DCF analyses should be scrutinized and made to pass rigid tests.

AN INSTRUCTIVE PRO FORMA

Exhibit 1 is a pro forma cash flow statement for a twelve-story office property encumbered by "full service" or "gross" leases (with expense stops). It calculates the present value of its net operating income (NOI) and a reversion by discounting these flows at an equity yield rate or IRR. It illustrates some of the problems often found in cash flow projections.

Inflation of Income and Expenses

One obvious feature of the analysis in Exhibit 1 is the fact that income grows with perfect regularity (exactly 5 percent per year), indicating that a lease-by-lease analysis was probably not performed. The reader must immediately ask some obvious questions. Are there long-term leases that limit the upside rental income potential? What are the assumptions concerning market rents? Are they based on quoted rental rates or effective rental rates? Have rental statements and other concessions (such as moving allowances or extra interior finish) been accounted for? The creators of Exhibit 1 used quoted rents rather than effective rents and inflated them at 5 percent per annum. They have phased out rental concessions after the first three years. As a result, effective rents are rapidly increasing.

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Comparison of eleventh year rental income of \$4,323,000 to first year "Gross effective rental" income (gross potential income adjusted for rental concessions) of \$2,505,000 produces a compound growth rate of 5.6 percent. Although the difference between 5 percent and 5.6 percent seems slight, this treatment of rent concessions accounts for 10 percent of the rental growth over the holding period (72.44 percent versus 62.89 percent).

Growth of Operating Expenses

The rates of growth that the pro forma assigns to cash flow categories affects the outcome of the analysis. The observer must compare the relative growth rates assigned to income and expenses. It is a truism that expense growth exceeds income growth over the long term because operating expense ratios usually increase as a building ages. Exhibit 1 assumes a 5 percent growth rate in rental income and a 4 percent growth rate in expenses. Because these rates are compounded over a ten-year period, rents grow 62.9 percent while expenses grow only 49.2 percent. Thus, they drive the expense ratio for this property down at a time when it should be going up.

	Base Rental Income (in \$000)	Expenses (in \$000)	Ratio of Expenses to Income
Year 1	2,654	1,138	42.9%
Year 11	4,323	1,698	39.3%

The Building Owners and Managers Association publication, 1986 *B.O.M.A. Experience Exchange Report: Income/Expense Analysis for Office Buildings*, gathers national data on income and expenses for office buildings. It compares mean income and expenses for various categories of office buildings and includes in its calculations comparative expense-to-income ratios for buildings of various ages. These are summarized in Exhibit 2.

EXHIBIT 2

RATIO OF EXPENSES TO NET OPERATING INCOME IN BUILDINGS OF VARIOUS AGES AND VARIOUS BUILDING HEIGHTS

Age	5-9 Stories	10-19 Stories	20-29 Stories
0-9 years	.396	.398	.428
10-19 years	.571	.471	.538
20-29 years	.584	.564	.5
30-39 years	.849	.607	.63

If the twelve-story building of Exhibit 1 were typical of National BOMA data and had a pre-

cisely average relationship of expenses to income, it would be incurring 39.8 cents of expenses for every dollar of income early in its life, 47.1 cents of expenses per dollar of income ten years later, and 56.4 cents per dollar of income twenty years later. If expenses grow at 5 percent per year as assumed in the pro forma, what should be the expected income growth to produce the proper income expense ratios in ten years and twenty years?

The value of \$.398 growing at 5 percent per year for ten years is $[\$.398 (1.05)^{10}]$ or \$.648. If 64.8 cents is 47.1 percent of income, the income that it produces is

$$\frac{.648}{.471} = \$1.39796$$

Thus, a dollar of expenses in year ten will produce \$1.40 of income. If \$1 of year 1 income is to produce \$1.40 in ten years time, income need grow at an average annual rate of only 3.2 percent.

The same set of calculations applies to the second ten years. BOMA averages indicate that year 10 expenses per dollar of income are 47.1 cents. The value of \$.471 growing at 5 percent per year for ten years is $[\$.471 (1.05)^{10}]$ or \$.76721.

$$\frac{.76721}{.564} = \$1.36$$

Thus, a dollar of year 20 expenses produces \$1.36 of year 20 income. If a dollar of year 10 income is to grow to \$1.36 by year 20, the growth rate is 3.125 percent per year.

Obviously, the income expense ratio of no individual building stays at exactly national averages. The relationships may diverge sharply in unusual market situations in which supply is restricted relative to demand. Especially in this day of competition among developers, these restricted market situations are comparatively few. In any case, reviewers should be exceedingly skeptical of any DCF analysis in which income growth exceeds or even is equal to expense growth. If income growth is expected to be stable, expenses should usually increase at a rising rate.

Digression on Percentage Rent

The reviewer who is examining the pro forma of a property in which the leases call for percentage rent should be aware of percentage rent characteristics. The landlord's percentage rental income does not necessarily increase at the same rate as either the building's base rent growth or

the tenant's sales growth. If sales breakpoints are "natural breakpoints" (i.e., they are established by dividing the percentage rate into the minimum rent), then the sales overages (on which the tenant pays percentage rent) will decline as the parties negotiate new, higher rent leases.

For example, a tenant pays \$12 per square foot and pledges to pay 6 percent on sales overages above a breakpoint. The natural breakpoint is $\$12 \div .06 = \200 per square foot. If the tenant has sales of \$250 per square foot, he pays 6 percent of the \$50 per-square-foot sales overage, or \$3 per square foot. Assume that he renegotiates rent at the end of the lease term for a new rent of \$18 per square foot. The new breakpoint is $\$18 \div .06 = \300 per square foot. Because the \$300 breakpoint exceeds his sales income of \$250 per square foot, percentage rent falls from \$3 per square foot to zero. Thus, percentage rental income can decrease while all other growth trends are positive. Because percentage rental income is a residual, however, it can also grow much faster than sales growth or rental growth.

Expense Stops and Expense Recovery Income

Exhibit 1 improperly inflates expense recovery income at 4 percent per annum. When a property is encumbered by full-service or "gross" leases, tenants whose leases expire may be able to negotiate new leases with higher expense stops. If renewing tenants are able to get new expense stops equivalent to their pro rata share of prior-year operating expenses, they reduce their contribution to the building's expense recovery income and consequently total expense recovery income increases at a rate less than the expense growth of the property.

Vacancy and Collection Losses

The vacancy and collection loss line in Exhibit 1 is estimated as 5 percent of gross potential income, starting in year 2. Observers should scrutinize this assumption for its relevance to the building's current and future market situation. How competitive is the subject property, given its proposed rents? What is the quality and duration of tenancies? What competitive properties currently exist, and what competition is expected to be built in the future? In many markets today, the rule-of-thumb 5 percent deduction for vacancy and collection losses is inadequate.

Most real estate software today allows one to program void periods between tenancies to add

precision to the estimation of vacancy losses. The crucial questions to ask are: (1) Are these void periods realistic given market conditions; and (2) What is the probability of tenant turnover?

Analyzing the Expense Lines

Expenses typically include taxes, insurance, utilities, management fees, cleaning, maintenance and repair, trash removal, landscaping, and parking lot maintenance. Growth in each expense category must be examined. Expenses should reflect any unusual inflationary cycles, such as the recent rapid increase in insurance costs in many markets or the rapid increase in fuel costs during the 1970s.

The subject property in Exhibit 1 is located in California. West Coast observers should recognize that property tax expenses are incorrect in the pro forma. In California, assessed value is adjusted to market value upon sale and assessments are generally one percent of value in addition to any special assessments.

In those markets in which space cannot be rented unless the property owner undertakes substantial tenant improvements at the property owner's expense, those who examine DCF proposals must look for a line in the "Expense category" with a title like "Tenant Improvements" or "Replacement Allowance." Most real estate software programs are capable of considerable precision in this area and allow one to plug into the model tenant improvement costs between tenancies. Once again, the observer must examine the probability of tenant turnover, the inflation of tenant improvement costs, and whether subsequent improvements will be as extensive. These expenditures are often erroneously classified as capital items and are deducted below the net operating income line in DCF analyses. Consequently, these tenant improvement expenses are omitted from the calculation of net operating income.

Leasing costs at the beginning of a project are usually treated as capital items, but re-leasing costs that are incurred in addition to management fees should be expensed rather than capitalized.

The Reversion Calculation

Many assumptions must go into the calculation of the reversion sales price. Typically, sales price is established by capitalizing the net operating income of the final or subsequent year of analysis. The resulting sales price is an influen-

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tial determinant of overall present value in any DCF analysis of ten years or less. For this reason, much care should go into selecting an ending capitalization rate or "overall rate" (OAR). If the property being analyzed is already at stabilized occupancy, the observer would not ordinarily expect a lower capitalization rate in the year of reversion than in the first year. In Exhibit 1, the ending capitalization rate is 8.5 percent, which is lower than the initial stabilized rate of 8.75 percent (based on 95 percent occupancy).

	NOI ¹	Price	OAR
Year 1	2,013	23,000	8.75%
Year 10	3,341	39,306	8.50%

Many analysts typically add at least one-half a percentage point to current cap rates when they capitalize tenth- or eleventh-year income. If the property has an especially limited economic life (say, it is a metal industrial building), one must make a stronger adjustment.

Californian properties present a unique reversion situation. Assessments are limited to 2 percent annual growth and properties are reassessed at market value upon sale; thus, the eleventh year's expenses should reflect greatly increased property tax expenses. Net income is consequently lower, but a slight downward adjustment can be made to the ending capitalization rate.

Observers should also examine sales costs upon reversion. Although it is true that investment-grade properties can be sold at commission rates as low as 1.5 percent, other closing costs (legal fees, prepayment penalties, and fix-up costs) may be incurred that may be equal to the cost of sales commissions.

Choosing the Internal Rate of Return

Finally, the chosen internal rate of return bears scrutiny. Is it consistent with market evidence for similar properties? Observers may want to interview clients or contacts in real estate investment firms for their investment criteria.

Observers who examine an IRR should be cognizant of relationships between current rates of return (such as the overall capitalization rate) plus rates of appreciation, perceived gradations of risk, and the resultant IRR. The IRR can be equated to the capitalization rate plus an adjustment for expected growth. When both income and value are expected to change at a constant ratio the relationship can simply be stated as:

$$IRR = OAR + a$$

where a is the rate of annual appreciation.

When income-to-value ratios are changing, similar but more complicated equations must be used. The overall capitalization rate should be based on stabilized net operating income or the IRR analysis technique described previously can lead to confusion.

Risk is an important element in IRR analysis. A real estate IRR should exceed the rates of return possible on investments less risky than real estate. If anything else were the case, there would be little incentive to develop or invest in real estate. Likewise, the IRR should exceed the mortgage loan interest rate. If anything else were the case, real estate developers and investors would leave their line of work to get into the lending business!

A CORRECTED CASH FLOW MODEL

Exhibit 3 is an eleven-year pro forma cash flow projection that avoids the errors and misleading rates of change included in Exhibit 1. The projection of rental growth and expense recovery income is based on a lease-by-lease analysis. Effective market rents are inflated at 3.5 percent per annum and expenses rise at 5 percent per annum. The vacancy and collection loss line assumes a general collection loss rate of 1.5 percent, six-month void periods between tenancies, and 35 percent tenant turnover upon lease expiration. This combination of assumptions results in an average vacancy rate of 8.5 percent.

Property taxes are computed at one percent of market value for the first year after purchase and for the year after reversion. Consequently, a sharp increase in taxes occurs between years 10 and 11, while in previous years increases are limited to 2 percent. Although all other expenses were inflated at 5 percent, insurance expenses were inflated at 6 percent per annum, reflecting current trends.

A reserve allowance for tenant improvements and leasing commissions was added to the pro forma. Given the forecast of 35 percent turnover, an averaging of all such costs over the holding period required a reserve of 13 percent of all other expenses combined.

¹ The year 1 NOI used here is not the \$1,424 thousand of Exhibit 1. It is a stabilized NOI calculated by subtracting from gross potential income of \$3,317 thousand, a stabilized 5 percent vacancy, and total expenses of \$1,138 thousand.

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EXHIBIT 3

CORRECTED ELEVEN-YEAR PRO FORMA CASH FLOW PROJECTION
(in \$000)

	1	2	3	4	5	6	7	8	9	10	11
Base rental income	2,505	2,556	2,850	2,900	2,798	2,808	3,022	3,199	3,345	3,420	3,734
Expense recovery income	663	663	645	667	681	768	746	752	806	869	895
Gross potential income	3,168	3,219	3,495	3,567	3,479	3,577	3,768	3,951	4,151	4,289	4,429
Less: Vacancy/collection loss	(606)	(250)	(370)	(225)	(181)	(194)	(658)	(460)	(287)	(286)	(307)
Effective gross income	2,562	2,969	3,125	3,342	3,298	3,382	3,061	3,461	3,793	4,002	4,322
Less: Management fee (4%)	(102)	(119)	(125)	(134)	(132)	(135)	(122)	(138)	(152)	(160)	(165)
Taxes	(140)	(142)	(145)	(148)	(151)	(154)	(157)	(160)	(163)	(166)	(187)
Insurance	(38)	(40)	(43)	(45)	(48)	(51)	(54)	(57)	(60)	(64)	(68)
Utilities	(585)	(614)	(645)	(677)	(711)	(747)	(784)	(823)	(864)	(908)	(953)
Other expenses	(287)	(301)	(316)	(332)	(349)	(336)	(385)	(404)	(424)	(445)	(467)
Reserve for TI's, commissions & capital improvements	(150)	(158)	(166)	(174)	(181)	(189)	(195)	(206)	(216)	(227)	(238)
Total expenses	(1,302)	(1,373)	(1,440)	(1,510)	(1,572)	(1,642)	(1,697)	(1,788)	(1,879)	(1,970)	(2,078)
NOI	1,262	1,596	1,685	1,832	1,726	1,740	1,364	1,673	1,914	2,032	2,244

Reversion: $\$2,244,000 \div .12 = \$18,700,000$

-Closing costs (4%) (748,000)

Net sales proceeds \$17,952,000

Present value of reversion \$ 4,842,441

IRR = 14%

Present value of NOI \$ 9,118,000

IRR = 14%

Total present value \$13,960,441

Rounded to \$14,000,000

Initial OAR = 11.4% (based on stabilized occupancy of 91.5%)

Ending OAR = 12%

An examination of the first year of income on a vacancy-stabilized basis yields an initial OAR of 11.4 percent (versus an actual rate of 9 percent). This corresponds well with the ending capitalization rate of 12 percent.

NINE TEST AREAS

This article has identified nine problem areas that may mislead those who wish to evaluate pro forma cash flow statements and DCF analyses. In summary, they are the following:

- Mismatched growth rates between rental income and expenses, which become particularly misleading when they are compounded over a long period of time. For most types of properties, expense ratios should increase over time.
- Failure to consider rental concessions and effective rents and the substitution of quoted rents. Failure to use proper market rates.
- Absence of lease-by-lease analysis in properties encumbered by long-term leases (leases that extend beyond the period of analysis).
- Figures that project that expense recovery income will increase at the same growth rate

as other expenses in a property encumbered by gross leases with expense stops.

- Projections for vacancy and collection losses that are not synchronized with market conditions.
- Use of operating expense categories that do not include all cost items. Common omissions are tenant improvements and leasing commissions.
- Use of ending capitalization rates that are lower than starting capitalization rates. Reversion capitalization rates should be related to the subject's property's age and remaining economic life.
- Underestimation of sales and other reversion costs.
- Use of an inappropriate internal rate of return.

This basic checklist enables observers to scrutinize pro forma cash flow statements for obvious errors, but it should by no means be considered exhaustive. Observers should seek some type of verification for every assumption used in the analysis, and the suggestions in this article should be considered merely as a prelude to proper due diligence.