

COMMERCIAL LEASE TENANT CASH OUTFLOW FORECASTING USING MULTIPLE METHODOLOGIES

Dennis Zocco, University of San Diego

CASE DESCRIPTION

The primary subject matter of this case is cash flow forecasting in the context of commercial real estate finance decision-making. Secondary issues examined include the financial analysis necessary when deciding on the appropriate lease type among Gross, Modified Gross, and Net commercial lease choices, the use of consumer and producer price indexes in generating tenant lease-based cash outflow forecasts, forecasting using the linear regression, historical mean, and Monte Carlo simulation methodologies, and the role of risk aversion in decision-making under uncertainty. The case has a difficulty level of four, appropriate for senior level courses, and five, appropriate for first year graduate students. The case is designed to be taught in either an entrepreneurial finance course, a real estate finance or commercial property management course, or an introductory forecasting course. The case can be taught in one class hour with two hours of outside preparation using an exclusively class discussion approach with forecasting results provided to the student or three class hours with five hours of outside preparation with students collecting data and forecasting tenant lease cash outflows. In addition to instructor notes, two versions of a financial model are available on request of the author as case supplements for instructors: a Master version, which provides completed forecast setups, recent data, and forecast results, and a Data-Entry version which is the Master version without the data and forecast results.

CASE SYNOPSIS

A young, recently-graduated financial analyst receives her first assignment from her startup company's CFO: develop a recommendation, with justification, on the appropriate lease type—Gross Lease, Modified Gross Lease, or Net Lease—that the company should accept in signing a new five-year lease for office space. The space location and size have already been decided. The only decision left is which lease type to accept. The analyst takes a tenant cash outflow forecasting approach to her assignment and uses three methodologies—linear regression, historical mean, and Monte Carlo simulation—to forecast the projected future cash outflows associated with each lease type. The analyst's plan is to use the appropriate ex-ante lease-related expense data to develop forecasts of the cash outflow for each lease type under each forecasting methodology, analyze her company's forecasted cash outflows in both current and present value dollars, and then make her lease type recommendation based upon her analysis.

THE SITUATION

Early Monday morning, you're sitting at your cubicle desk when you receive a call from your company's CFO requesting a short meeting, immediately. You have been with the company for only two months, but they have been exciting months for you. The company is a young, fast-growing startup, founded only eleven months earlier. At graduation, you were hired into a financial analyst position and so far have been assigned to lend a helping hand to marketing, design, purchasing, and even programming—all interesting assignments but none related to your

major—finance. You had spoken to the company CFO only twice, the first time in person during your interview process and the second on a phone call when she offered you the position.

When you arrive at her office, she directs you to a seat in front of her desk. She says:

Due to the fast growth of our company, we now need more space. We are not going to renew our current lease at the end of this month. Instead, we are ready to sign a new lease for 10,000 square feet of office space for a term of five years in the Upper West Side of New York City. The development is owned by Rochester Industrial Logistics, otherwise known as RIL, a medium-sized industrial park company with commercial space developments across the northeastern U.S.

She hands you a sheet of paper showing the following information.

Lease Type	Included in Monthly Lease Payment	Lease Expenses Paid by Tenant	Annual Lease Price per Square Foot	Annual Price Increase for each Year of the Lease
Gross Lease	Rent plus Janitorial Services, Fuels & Utilities; Building Maintenance & Repairs; Insurance; Property Taxes	None	\$72.00	3.5%
Modified Gross Lease	Rent plus Building Maintenance & Repairs; Insurance; Property Taxes	Janitorial Services; Fuels & Utilities	\$64.00	3.5%
Net Lease	Rent	Janitorial Services, Fuels & Utilities; Building Maintenance & Repairs; Insurance; Property Taxes	\$50.00	3.5%

She continues,

We have agreements with RIL on all lease terms, including those on that sheet. However, RIL is willing to provide us with either a Gross lease, a Modified Gross lease, or a Net lease, our choice. I want you to perform a financial analysis of the three lease types and, based on your analysis, recommend to me which lease type you believe is best for our company. As the CFO of our company, I have a responsibility to manage our company's cash very efficiently. This lease is a five-year commitment of cash outflows, so it's important that we choose the best lease type for the company. In general, our company founders are by their nature risk-takers, as am I, but for our company to be successful, and even more critically, to survive, we need to be intelligent about our risk-taking. Our company's weighted average cost of capital is 12 percent. I would like your lease type recommendation with supporting rationale in a few days. Good luck with this project.

She stands and reaches across the table to shake your hand. You stand, shake her hand, and leave the office.

ANALYZING THE COMMERCIAL LEASE TYPES

Back at your desk, you are excited about your new assignment. You begin planning your approach. Since the company's CFO stressed the importance of her responsibility to manage the company's cash very efficiently, you decide that the company's lease-related cash flow will be a key element in developing your recommendation. Since all three lease types are for a space (location and square feet) already selected, cash inflows from the use of the space will be the same regardless of the lease type. Therefore, there is no need to include cash inflow in your lease cash flow analysis, only cash outflow. You decide to develop forecasts of your company's cash outflow, in both current and present value dollars, for each of the three lease types.

Lease-related cash outflow has two elements: the rent payments and, except for the all-inclusive Gross lease, the expense payments. The rent and annual percentage rent increases for each lease type have already been agreed upon. Rent payments are contractual and can be projected with certainty over the five-year lease term. The Modified Gross and Net leases require the tenant to directly pay for actual lease-related expenses in addition to the rent. Therein lies the tenant's cash outflow risk. The lease-related expenses over the term of the lease cannot be known with certainty; they are risky and can only be forecasted.

Under a Gross lease (first year annual lease price: \$72 per sf), the rent payment is all-inclusive for the tenant, that is, the tenant makes one payment each month to cover the base rent and all lease-related expenses. The landlord pays for all lease-related expenses from that rent payment. As those expenses are to be paid in the future, the landlord assumes the risk of uncertain future lease-related expenses and, in particular, that the actual lease expenses in any month, and over the term of the lease, may be greater than the anticipated expenses built into that month's lease payment.

A Modified Gross lease (first year annual lease price: \$64 per sf) includes in the monthly rent payment three of the five lease-related expense categories—Building Maintenance & Repairs, Insurance, and Property Taxes—which the landlord pays from the monthly rent payment. The tenant assumes the responsibility, and risk, for directly paying the uncertain Janitorial and Fuels & Utilities expense categories throughout the term of the lease. The landlord's risk is reduced, relative to the Gross lease, by having the responsibility for paying only three rather than all five of the lease-related expenses from the lease payment.

A Net lease (first year annual lease price: \$50 per sf) includes no expenses. The tenant makes the rent payment and also assumes the responsibility, and risk, for directly paying all five of the uncertain future lease-related expenses. The landlord has no responsibility for paying any lease-related expenses.

Based upon the structure of each lease type, your forecasted tenant cash outflow will be a combination of the projected certain rent payments and the forecasted risky expense payments.

TENANT CASH OUTFLOW FORECASTING

Your understanding of forecasting methods is that no one methodology is perfect; each has its advantages and disadvantages, often on a situational basis. You are concerned that relying on just one methodology to support your lease type recommendation might not be the best approach (Ghysels & Marcellino, 2018.) Therefore, you decide to use three forecasting methodologies: 1) linear regression, (2) historical mean, and 3) Monte Carlo simulation (Bates & Granger, 1969; Khalaf & Saunders, 2017).

You take the next few hours to research the available price data for the lease-related expense categories. Your research results are shown in Tables 2 and 3 below. Table 2 shows the Federal Reserve Bank of St. Louis monthly Producer and Consumer Price Indexes for the expense categories of Janitorial, Fuels & Utilities, Building Maintenance & Repairs, and Insurance. Annual commercial property tax rates are provided by the New York City Department of Finance.

Data	Time Series	Source	Download Location
Producer Price Index by Industry: Janitorial Services, Index Dec 2003=100, Monthly, Not Seasonally Adjusted	12/1/1994 to present	St. Louis Fed	https://fred.stlouisfed.org/series/PCU5617256172
Consumer Price Index for All Urban Consumers: Fuels and utilities, Index 1982-1984=100, Monthly, Not Seasonally Adjusted	10/1/2008 to present	St. Louis Fed	https://fred.stlouisfed.org/series/CUUR0000SAH2
Producer Price Index by Industry: Nonresidential Building Maintenance and Repair, Index Apr 2009=100, Monthly, Not Seasonally Adjusted	4/1/2009 to present	St. Louis Fed	https://fred.stlouisfed.org/series/PCU2381MR2381MR
Consumer Price Index for All Urban Consumers: Tenants' and household insurance, Index Dec 1997=100, Monthly, Not Seasonally Adjusted	10/1/2008 to present	St. Louis Fed	https://fred.stlouisfed.org/series/CUUR0000SEHD
New York Property Tax Rate Per \$100 of Assessed Value; Class 4 (Commercial Property), Annual	1981 to present	New York City Department of Finance	https://www1.nyc.gov/site/finance/taxes/property-tax-rates.page

You decide that your five-year expense forecasts will be based upon ten years (120 months) of ex-ante (historical) monthly price index data for all lease-related expenses except the New York City commercial property taxes, which will be based upon twenty years of annual tax rate data. However, the ex-ante lease-related expense data from your sources are price indexes and tax rates. Your expense forecasts need to be in dollars—actually, current and present value dollars. Therefore, you will need to determine a Month 1 expense starting point for your forecasts. You realize that from the lease information provided by your CFO (Table 1), you can infer RIL's representation of the lease-related Year 1 annual total expenses per square foot. You can then use the expense percent allocations you discovered in your research (Table 3) to find RIL's best estimate of the individual expenses.

Janitorial	13.83%	Insurance	6.36%
Fuels & Utilities	20.69%	Commercial Property Taxes	36.96%
Building Maintenance & Repairs	22.15%	Total	100.00%

You also discovered in your research that commercial property landlords normally add an 8% risk premium to the lease-related expenses included in the rent payment to mitigate the risk to the landlord of underestimating future expenses. You assume RIL has included that risk premium in the rent schedule presented to your company (Table 1.) For the lease types in which all (Gross lease) or some (Modified Gross lease) expenses are included in the rent payment, that risk premium results in your company paying 8% more than the landlord's best estimate of the future lease-related expenses.

THE LEASE TYPE RECOMMENDATION

In arriving at your lease type recommendation, your plan is to consider not only the relative levels of forecasted cash outflows for the different lease types, but also the riskiness of those cash outflows. The five-year term of the lease is more than five times longer than your company has been in existence, a significant future commitment of cash outflow, a portion of which is uncertain with the Modified Gross and Net leases. You remember that your CFO stated she and the founders are risk-takers but "for our company to be successful, and even more critically, to survive, we need to be intelligent about our risk-taking." A clear message to you that the risks inherent in each lease type need to be carefully considered.

You have only a few days to collect your data, run the forecasts, analyze the results, and consider an acceptable cash outflow risk in light of your perception of a company-acceptable degree of risk aversion (Charness, Gneezy & Imas, 2013.) Ultimately, your judgment will be the deciding factor in arriving at your final lease type recommendation (Eroglu & Croxton, 2010; Fildes & Goodwin, 2007a; Fildes & Goodwin, 2007b; Sanders et al., 2005.)

THE CHALLENGE

Assume you are the young, recently-graduated financial analyst. Please indicate the lease type recommendation you will make and your supporting rationale for that recommendation.

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