A Different Twist to Risk-Value Analysis in the Windy City's Metro Commercial Real Estate Market: Stratifying the Modified Internal Rate of Return within an American Put Option Strategy

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Two commercial Chicago metro office buildings are valued under the Discounted Cash Flow (DCF) method. This occurs within an American Put Option strategy which broadens the number of acceptable actions for investors. The use of the Modified Internal Rate of Return (MIRR), a technique that is inherently more reliable than the traditional Internal Rate of Return (IRR), is advocated. Further, this paper incorporates Stratifying the MIRR which provides another layer of risk analysis that facilitates project comparisons even where other discounted cash flow methods have led to conflicting results.

INTRODUCTION

The process of analyzing and valuing competitive commercial real estate locations is based upon the unique real estate properties themselves, other available investment opportunities, the expected rates of return, and the degree of risk associated with each of the capital projects. One major point of this paper is that when faced with the task of ascertaining the net cash flow value of commercial assets, real options exist for an investor. An investor has an option, the right but not the obligation, to make a future sell decision. Specifically, an American Put Option strategy, where reversion can happen at any time during the holding period, is analyzed. Just as with financial options, the value of the American Put real option is contingent on future event(s) such as net lease revenue receipts and the expected future re-sale value. The value of real estate projects are likely to fluctuate stochastically and the investor will choose to exercise the option only when it is perceived to be 'in-the-money' (Dixit and Pindyck, 1994). Utilizing actual real estate data, this paper analyzes a specific mutually exclusive case between two similar office buildings in downtown metro Chicago.

The Net Present Value (NPV) and the Internal Rate of Return (IRR) are normally used to rank the desirability of projects in a traditional Discounted Cash FLow (DCF) process. In order to determine the relative weights and timing of the various components of the return, the IRR can be partitioned (Brueggeman and Fisher, 2008). However, the IRR can be unstable at times. Two major weaknesses are that a project can produce multiple rates of return depending on the sign of the respective cash flows, and the rate itself is used as the reinvestment rate of return for the project. The latter can prove to be an unrealistic assumption in the valuation process. This paper advocates the use of the Modified Internal Rate of Return (MIRR) as an alternative because it will not produce multiple rates of return and uses the cost of capital and not itself as the reinvestment rate of return and offers a relatively more conservative return. In an extension of the literature, stratifying the MIRR adds another layer to the risk analysis aspect that goes beyond that of the IRR and its partitioning.

The related real option literature and the source of the data for the analysis are reviewed initially. This is followed by the methodology section and the empirical results. The analysis of the empirical results and the conclusion round out the paper.

RELATED LITERATURE

A major finance topic for discussion and research is the impact of risk and uncertainty on rational decision rules used in the selection of cash-flow driven projects comprised in a corporate capital budget. In an early empirical study, Lintner (1965) found that the expected return in a capital budgeting case was an increasing function of the risk-free rate of return, the market price of dollar risk, the project's variance of returns, the aggregate present value of the project and its co-variance with existing assets of the firm, and the co-variance of the project with other projects included in the capital budget. A situation of certainty exists when the investor knows for sure (100% probability) what his future returns will look like (Levy and Sarnat, 1984). Looking at capital budgeting under uncertainty (Huang and Litzemberger, 1988) and (Lucas and Prescott, 1971), using the Sharpe-Lintner-Black model of capital market equilibrium, Fama (1977) found that the present value of expected future cash flows depends on the risk-adjusted discount rates for each of the periods until the flow of funds is realized. The discount rate experienced adjustments for risk over the time period due to the possible reassessment of the future cash flows. Trigeorgis and Mason (1987) found that while the traditional Discounted Cash Flow (DCF) method takes into account the time value of money, systematic cash flows, and the ultimate resale of the property, it has a weakness in that it tends to be passive and does not capture the ability of the investor to adapt or revise their decisions in response to market developments. Trigeorgis (1993) further posited that investors follow a set of rigid rules and tend not to alter a project at any specific stage of its useful operating life. Counter to this position is the recognition that real options exist that allow investors to take a more strategic approach to decision making as they have the right but not the obligation to make an investment decision. Berger, Ofek, and Swary (1995) claim that investors, in valuing a firm, have an abandonment option and predict that the firm valuation is positively related to liquidation value after controlling for expected future cash flows. An abandonment option is analogous to an American Put option on a dividend paying security (Bonini, 1977). Concerned with valuing projects that had several options available and then quantifying their interactions, Trigeogis (1993) found that the value of real options may not be additive. Valuing two options in a toll-road project in Australia, Rose (1998) found that at least one of the options displayed a significant value. The interaction between the options influenced the one significant option value. Ignoring embedded options could result in underestimating the value of a project. In a hypothetical example, where a choice must be made between buying a fleet of gasoline-powered cars or hybrid autos, Stout, Xie, and Qi (2008) employ an American option framework. This option gave managers the flexibility to assess their decisions over each year of the investment period. Real options allow investors to take a more strategic approach to decision making as they have the right but not the obligation to make an investment decision. Just as financial options derive their value from the underlying asset, the value of real options is contingent on future events (Xie, 2009). The findings of these latter works imply that the flexibility that accrued to management through the recognition of a real option could be as economically significant as the expected future cash flows of the project.

DATA REVIEW

The data for the comparison of the commercial real estate investments is obtained from REIS, Inc. The company is a provider of commercial real estate performance data and analysis. It specifically focuses on the metro (city), submarket (neighborhood), and property level. The site offers coverage of 80 U.S. metropolitan areas and over 2,300 submarkets for the office, apartment, retail, and industrial sectors.

This paper analyzes a mutually exclusive situation that specifically compares two downtown Chicago office building investments. The properties are located at 10 South Riverside Plaza and 200 North LaSalle Street (hereafter referred to as Riverside and LaSalle). Their valuations will follow a traditional

discounted cash flow (DCF) process. The physical characteristics for the Riverside and LaSalle properties are presented in Table 1 while the pertinent dollar per square foot data, used in the DCF model, for each property, is reported in Table 2. The approximate initial outlay for the LaSalle location was $108.7 million and $144.1 million for the Riverside property. These are historical purchase prices from 2008 based on data from REIS, Inc.

TABLE 1
PHYSICAL CHARACTERISTICS FOR THE RIVERSIDE AND LASALLE PROPERTIES

Property Name	Riverside	LaSalle
Address	10 South Riverside Plaza	200 North LaSalle Street
City	Chicago	Chicago
Property Type	Multi-Tenant	Multi-Tenant
Building Area (sf)	702,439	621,428
Buildings/Floors	1/22	1/30
Year Built/Renovated	1965/1994	1984/not yet

TABLE 2
DOLLAR PER SQUARE FOOT (PSF) DATA FOR THE RIVERSIDE AND LASALLE PROPERTIES

Property Name		Riverside	LaSalle
Net Rentable Area	psf	702,439	621,428
Sale Price	psf	$205.00	$175.00
Average Asking Rent	psf	$ 27.51	$ 26.36
Vacancy Loss Rate	%	14.40%	9.20%
Expense Stop	psf	$ 12.89	$ 10.91
Free Rent Concessions	psf	$ 0.23	$ 0.25
Credit Loss	%	1.00%	1.00%
Operating Expenses	psf	$ 14.12	$ 11.89
Capital Reserves	psf	$ 0.10	$ 0.11
Going-In-Cap-Rate	%	5.20%	7.50%

Notes for Table Two's line items:

- All per square foot (psf) figures are on an annual basis.
- Net Rentable Area (NRA) of a building included in the transaction, expressed in square feet, is an approximation based on verified public records.
- The potential rent revenue is the product of the building rentable area estimate and the average asking rent which is the market rent paid by a potential tenant.
- Sale Price (psf) is the purchase price of the property per square foot of net rentable area (NRA).
- Asking Rent for office properties is a weighted average quoted as annual gross rent per square foot.
- Vacancy losses are estimated rent losses from unoccupied space and unpaid rents.
- The Expense Stop creates an upper limit on the amount of operating expenses that the owner will be responsible for.
- Expense Reimbursement Recovery is the difference between the operating expense psf and the expense stop psf. The excess must be paid by the tenant. The recoverable operating expenses are property taxes, insurance, and maintenance.
- Free Rent Concession, to induce the lease signing, is the offer of a free rent period during which no rent is required to be paid. It is the total dollar amount or number of months free rent granted per lease terms.
- Credit Loss is the total amount of rent due that the landlord is unable to collect due to tenant default.
- Operating Expenses are the average annual costs, per square foot, of operating buildings that include property taxes, energy, janitorial service, insurance, common area maintenance, and management and leasing fees.

- Capital Reserves is an allowance that provides the periodic replacement of building components that wear out more rapidly than the building itself. They must be replaced during the economic life of the building.
- The reported estimated Going-in Capitalization Rate (Cap Rate) can be compared to the Reis Indexed Metro Office Cap Rate of 7.4%. The REIS Indexed Metro Office Cap Rate is modeled as a function of risk-free interest rates, metro rent growth expectations, current construction activity, and by running measures of volatility in rents. These measures are proxies for capital conditions, income expectations, and risk.

REIS, Inc. also compiles aggregate metro property data through Metro Analysis, Rent Comparables and Sales Comparables reports. The metro or metropolitan area is a geographical division of the United States that includes a major city, for example, Chicago, and its surrounding communities and counties. These Metro Analysis reports offer reasonable property benchmarks for the time frame of the paper's study. Relevant facts from their analyses are presented in Table 3 below.

TABLE 3
RELEVANT DATA FROM THE CHICAGO METRO AREA ANALYSIS CONDUCTED BY REIS, INC.

Annualized 5-year Rent Growth	2.1%
Annualized 5-year Vacancy Rate	17.6%
Average Lease Term (years)	5.5
Average Leasing Commissions	4.1%
Free Rent Concession	2.4 months
Inventory Growth Rates (5 year forecast)	.4%
Annualized 5-year Construction/Absorption	1.9
Inflation Rate per www.InflationData.Com	3.85%
Stabilization Rate*	68.18%

Notes:
Vacancy Rate is the amount of available space expressed as a percentage of total inventory.
Lease term is the average term currently being quoted for new leases, in years.
Leasing Commission is an amount paid to a real estate broker in exchange for bringing together the parties of the lease agreement. Usually it's paid in the form of a percentage of the yearly rent.
Free Rent is the average number of months given away to entice potential leasee.
Inventory Growth Rate is the average growth rate in metro office building sf supply.
Construction/Absorption is the construction or completions during the time period divided by absorption during the same time period.
*Stabilization is achieved when the average vacancy rate of the properties built in any given year equals or is less than the Metro's average overall vacancy rate for the last five years.

These commercial assets are acquired subject to existing leases as noted by the lease terms and leasing commissions in Table 3. Even if this study were based upon a new development project, the property lease would be based on typical leases in the marketplace. The lease and its terms, such as rent and expense reimbursements, must be accounted for in the calculation of the property's relevant future net operating income (NOI) and future reversion (RV) or sale price. The length of the property lease, this study uses an average five year period, plus its other specific terms affect the risk and return of the respective projects and cannot be ignored in the determination of the expected property cash flows.

METHODOLOGY

In order to consider the mutually exclusive case between the Riverside and LaSalle properties, this paper conducts a financial analysis that enables an investor to assess whether the risk associated with these assets is commensurate with their expected values. The concept of due diligence is critical and is extended by this paper by reviewing the risk-return tradeoff within an American Put Option framework. Within this real option strategy, a discounted cash flow (DCF) method is followed along with the comparison of both the IRR and MIRR. This comparison is enhanced through the inclusion of stratifying the MIRR. The relevancy of the latter accrues from the overall strengths of the MIRR over the IRR and

the ability of an investor to weight how much of the return is associated with the annual future operating cash flows of the project and the timing of the estimated future cash flow from the resale of the property. It's the weights associated with these two specific cash flow components that allows the incorporation of relative risk which enables an investor to compare projects even where other techniques have led to conflicting results (Plath and Kennedy, 1994). It is important to note that the appeal of the two commercial properties is not for the use or occupancy of the owner but that they are considered to be income-producing assets. Income properties are bought and sold on their ability to generate future income streams. This income stream is a cash flow. Using the discounted cash flow method (DCF), an investor will capitalize the expected future net operating income associated with the property and determine the asset's estimated net present value (Gallinelli 2009). The DCF analysis helps to determine if a proposed project can generate sufficient risk-adjusted returns. It is a standard framework for multi-period real estate investment analysis. In the case of the Riverside and LaSalle locations, both present changing rent rolls and lease renewals and lease variables (inflation) that can change the level of gross operating income. Also impacted are the operating expenses and expense reimbursements which in turn affect both the net operating income (NOI) for each year and the net terminal value or reversion value (RV) (DeLisle, 2009). The basic DCF model to evaluate the property's NPV is:

$$\text{NPV Office Building} = \sum NOI_t / (1+ capr)^t + RVt / (1+capr)^t - IO_0$$

The NPV is equal to the present value of future cash inflows – initial investment.
where: NOI = expected net operating income (cash flows) for the office building.
RV = reversion (resale) value of the property; net terminal value.
IO = initial investment outlay.
capr = Capitalization Rate for the office building.
t = unique time period for each of the expected future cash flows.

For each of the two commercial assets, an income stream is established. It's calculation starts with the Effective Gross Revenue (also called the Gross Operating Income), less operating expenses and capital reserves, resulting in the Net Operating Income (NOI) or Net Cash Flow, for each year of the holding period. It includes the Gross Selling Price or Reversion Value (RV) in the year of the sale. In using the NOI and the RV, the investor attempts to estimate the value of the property in terms of its ability to produce income, independent of income tax considerations or any financing. Tables 4 and 5 present the projected net cash flows for each property over the time period of 2008 through 2013.

If the appraised property value is a function of the income stream and the NOI results from the income stream that is generated from the operations of the property, the real estate investment is independent of external factors such as taxes or financing. The investor is deciding upon a property's income potential not the property itself. The before-tax NOI serves as an objective means of measuring the potential income stream from the property while the going-in capitalization rate acts as an investor's subjective estimate of how well the capital is required to perform (Gallinelli, 2004). Tax benefits are not ignored, rather, the implication is that an investor will consider the before tax cash flows, understanding that a tax benefit will be realized. (Brueggeman and Fisher, 2008).

The existing financing terms are assumed to be similar for both properties and as such, the expected returns for any particular group of investors should not be impacted by the financing of the project. It's not that interest rates or access to debt markets don't impact value, but under any economic climate, an investor will choose the equity-debt allocation based on the degree of risk that they are most comfortable with (Fisher 2008).

TABLE 4
PROJECTED NET CASH FLOW FROM OPERATIONS: RIVERSIDE PROPERTY

Year		2008	2009	2010	2011	2012	2013
		1	2	3	4	5	6
Rentable Area Assumption (sf)	702,439						
Average Asking Rate	3.85%	$ 27.51	$ 28.57	$ 29.67	$ 30.82	$ 32.00	$ 33.23
Potential Rent Revenue	3.85%	$ 19,327,015	$ 20,071,105	$ 20,843,843	$ 21,646,331	$ 22,479,714	$ 23,345,183
Vacancy Loss	14.40%	2,783,090	2,890,239	3,001,513	3,117,072	3,237,079	3,361,706
Effective Rent Revenue		$ 16,543,925	$ 17,180,866	$ 17,842,329	$ 18,529,259	$ 19,242,635	$ 19,983,477
Operating Expense psf	3.85%	$ 14.12	$ 14.66	$ 15.23	$ 15.81	$ 16.42	$ 17.06
Expense Stop psf	3.85%	12.89	13.39	13.90	14.44	14.99	15.57
Expense Reimbursement psf		$ 1.23	$ 1.28	$ 1.33	$ 1.38	$ 1.43	$ 1.49
Expense Reimbursement		$ 864,000	$ 897,264	$ 931,809	$ 967,683	$ 1,004,939	$ 1,043,629
Free Rent Concessions	$ 0.23	161,561	161,561	161,561	161,561	161,561	161,561
Credit Loss	1.00%	193,270	200,711	208,438	216,463	224,797	233,452
Effective Gross Revenue		$ 17,053,094	$ 17,715,858	$ 18,404,139	$ 19,118,918	$ 19,861,216	$ 20,632,093
Total Operating Expenses		$ 9,918,439	$ 10,300,299	$ 10,696,860	$ 11,108,689	$ 11,536,374	$ 11,980,524
Capital Reserves	$ 0.10	70,244	70,244	70,244	70,244	70,244	70,244
Total Expenses		$ 9,988,683	$ 10,370,542	$ 10,767,104	$ 11,178,933	$ 11,606,618	$ 12,050,768
Net Operating Income (NOI) or Net Cash Flow		$ 7,064,411	$ 7,345,315	$ 7,637,035	$ 7,939,985	$ 8,254,599	$ 8,581,325

*Expected inflation rate is 3.85%

**Other variable % and $ from Table II

TABLE 5
PROJECTED NET CASH FLOW FROM OPERATIONS: LaSALLE PROPERTY

Year		2008	2009	2010	2011	2012	2013
		1	2	3	4	5	6
Rentable Area Assumption (sf)	621,428						
Average Asking Rate	3.85%	$ 26.36	$ 27.37	$ 28.43	$ 29.52	$ 30.66	$ 31.84
Potential Rent Revenue		$ 16,380,033	$ 17,010,664	$ 17,665,575	$ 18,345,699	$ 19,052,009	$ 19,785,511
Vacancy Loss	9.20%	1,506,963	1,564,981	1,625,233	1,687,804	1,752,785	1,820,267
Effective Rent Revenue		$ 14,873,070	$ 15,445,683	$ 16,040,342	$ 16,657,895	$ 17,299,224	$ 17,965,244
Operating Expense psf	3.85%	$ 11.89	$ 12.35	$ 12.82	$ 13.32	$ 13.83	$ 14.36
Expense Stop psf	3.85%	10.91	11.33	11.77	12.22	12.69	13.18
Expense Reimbursement psf		$ 0.98	$ 1.02	$ 1.06	$ 1.10	$ 1.14	$ 1.18
Expense Reimbursement		$ 608,999	$ 622,276	$ 635,807	$ 649,595	$ 663,644	$ 677,956
Free Rent Concessions	$ 0.26	161,571	161,571	161,571	161,571	161,571	161,571
Credit Loss	1.00%	163,800	170,107	176,656	183,457	190,520	197,855
Effective Gross Revenue		$ 15,156,698	$ 15,736,281	$ 16,337,922	$ 16,962,462	$ 17,610,776	$ 18,283,773
Total Operating Expenses		$ 7,388,779	$ 7,673,247	$ 7,968,667	$ 8,275,461	$ 8,594,066	$ 8,924,937
Capital Reserves	$ 0.11	68,357	68,357	68,357	68,357	68,357	68,357
Total Expenses		$ 7,457,136	$ 7,741,604	$ 8,037,024	$ 8,343,818	$ 8,662,423	$ 8,993,294
Net Operating Income (NOI) or Net Cash Flow		$ 7,699,562	$ 7,994,677	$ 8,300,898	$ 8,618,644	$ 8,948,353	$ 9,290,479

*Expected inflation rate is 3.85%

**Other variable % and $ from Table III

Notes for Tables 4 and 5:
The estimated average annual inflation rate adjustment is 3.85%. The NOI increases each year even if leases are not renewed.
Vacancy losses are estimated rent losses from unoccupied space and unpaid rents.
Expense Stop creates an upper limit on the amount of operating expenses that the owner will be responsible for.
Expense Reimbursement Recovery is the difference between the operating expense psf and the expense stop psf. The excess must be paid by the tenant. The recoverable operating expenses are property taxes, insurance, and maintenance.

Free Rent Concession, to induce the lease signing, is the offer of a free rent period during which no rent is required to be paid. It is the total dollar amount or number of months free rent granted per lease terms.
Credit Loss is the total amount of rent due that the landlord is unable to collect due to tenant default.
Effective Gross Revenue is determined as the effective rent income plus the operating expense recoveries less the provisions for the free rent period and potential credit losses.
Operating Expenses are the average annual costs, per square foot, of operating buildings that include property taxes, energy, janitorial service, insurance, common area maintenance, and management and leasing fees.
Capital Reserves is an allowance that provides the periodic replacement of building components that wear out more rapidly than the building itself. They must be replaced during the economic life of the building.
Net operating income (NOI) is calculated as the net of the effective gross revenue and both the operating expenses and the provision for future capital outlays.
Even though the worksheet calculates the NOI, the measure is not income as described under generally accepted accounting principles (GAAP) but is cash flow. The term NOI is interchangeable with the net cash flow from operations.

Two accepted measures of analyzing the viability of real estate investments are the Net Present Value (NPV) and the Internal Rate of Return (IRR) techniques. The IRR builds on the NPV framework attempting to find a discount rate which equates the NPV to zero, creating a breakeven point. While it considers both the magnitude and timing of each cash flow, it assumes a cash flow reinvestment rate at the IRR, which can give an unrealistic view of a project's potential value. A project with positive and negative cash flows delivers multiple IRRs. A conflict between the decision rules of each technique can occur making comparisons between alternative projects, especially mutually exclusive ones, difficult. An investor can partition the IRR (Brueggeman and Fisher, 2008) which is a process of dividing the expected future cash flows into their respective sources; cash flows from operations and those associated with the expected selling price of the asset. The word, partitioning, however, does not convey a sense that there is a link between the items in the data set. This is not the case. The use of the modified internal rate of return (MIRR) gives the investor a more stable and hence stronger technique to analyze the cash flows of a project. It results in a more conservative return than the IRR; negative cash flows are cancelled out by positive ones, and compounds the cash flows forward at a more realistic reinvestment rate based on the project's cost of capital. It then discounts this future cash flow back to the initial outlay date at a rate that more fairly represents the investment risk of the project. The basic model follows:

$$\mathbf{Zero = FVNOI_t / (1 + MIRR)^t + RV_t / (1 + MIRR)^t - IO_0}$$

The MIRR is the rate which equates the NPV to Zero
Future value of the sum of each NOI @ capr
$\sum NOI_t (1+capr)^t$ = FVNOI at the end of the lease term
RV = the reversion (sale) value at the end of the lease term
NOI = the net operating income or net cash flow for each year in the investment horizon.
capr = the capitalization rate used to determine the future value of net cash flows
FVNOI = the future value of the sum of each periodic NOI by the end of the lease term
RV = the Reversion value for the office building at the end of the lease term
MIRR = the modified internal rate of return for each office building
IO = the Initial investment outlay
t = the time period as of the end of the lease term.

This paper extends the literature by stratifying the MIRR. The relative proportions or strata of the MIRR is represented by the net operating cash flows and the cash flows resulting from the expected future reversion value of the property. Stratifying implies a ranking or priority of the relevant cash flows (as opposed to a partition). There generally is more certainty associated with the funds that occur earlier than later in the investment holding period. Hence, the greater the proportion of resale cash flow, the greater the risk an investor must face. The process offers an additional layer of analysis that reveals that the risk differences between the income properties are strong enough to challenge, specifically in the case of the mutually exclusive Riverside and LaSalle properties, the traditional decision rules of the NPV, IRR, and it's partitioning. The process of stratifying the modified internal rate of return is presented below.

Stratifying the Modified Internal Rate of Return

Step 1: Calculate the MIRR as described above.
Step 2: Use the MIRR to discount back the NOI cash flows and the RV cash flow
Step 2: Formulate the weight or strata of the MIRR
[a] $PVNOI_t + PVRV_t = TPVCF_t$
[b] $PVNOI_t / TPVCF_t$ = relative proportion of MIRR from the discounted total future NOI
[c] $PVREV_t / TPVCF_t$ = relative proportion of MIRR from the discounted future RV
where:
$PVNOI_t$ = present value of future net operating income from the end of lease term
$PVRV_t$ = present value of future reversion value from the end of lease term
$TPVCF_t$ = Total present value of both operating and reversion cash flows at time period zero
Note: American Put Option – future reversion or sale of the office building can occur at any time during the holding term.

The results of Stratifying the MIRR are strengthened, in this research, as all of the anticipated future cash flows are partially determined by existing leases, mitigating some of the uncertainty typically associated with estimating these future cash flows.

EMPIRICAL ANALYSIS

This study argues that an investor can approach the income property valuation process following an American Put Option strategy. An advantage is that it offers investors the flexibility of choosing to sell the property during any year of the investment holding period. In order to determine the reversion value (RV) for both project Riverside and LaSalle, their net operating income (NOI) for the sixth year (2013) (Tables 4 and 5) is divided by each property's estimated going-in capitalization rate (Cap Rate) (Table 2). The given cap rate represents the return required for the particular property investment based on its risk when compared to returns earned from competing investments. When direct capitalization is used, the properties being reviewed need to be comparable. The two office buildings appear to be similar in terms of their construction, size, age, location, and functionality. When making estimates of the future property value, the handling of capital outlays is important, too. Here, each property reflects an actual 'Capital Reserve' provision (Table 2) in determining the net operating income (NOI). Further, consistency is maintained through the use of Table 3's relevant data from the metro area analysis conducted by REIS, Inc on important items as the average lease term and inflation rent escalator. Within an American Put Option framework, the expected future cash flows from the resale of each property and the NPVs of both locations are presented in Table 6 and Table 7, respectively.

TABLE 6
CASH FLOW FROM RESALE (REVERSION VALUE) FOR THE RIVERSIDE AND LASALLE PROPERTIES UNDER AN AMERICAN PUT OPTION STRATEGY

	Riverside	LaSalle
Cap Rate	5.20%	7.50%
Lease term	**Reversion Value**	**Reversion Value**
Year 1	$134,737,369	$92,756,207
Year 2	141,743,712	99,712,923
Year 3	149,114,386	107,191,392
Year 4	156,868,334	115,230,746
Year 5	165,025,487	123,873,052

Note: American Put Option – Reversion value calculated at the end of each year in holding period.

TABLE 7
NET PRESENT VALUE (NPV) FOR THE RIVERSIDE AND LASALLE PROPERTIES UNDER AN AMERICAN PUT OPTION STRATEGY

	Riverside	LaSalle
Initial Outlay	$143,999,995	$108,749,900
Cap Rate	5.20%	7.50%
Lease term	**NPV**	**NPV**
Year 1	($9,207,428)	($15,302,673)
Year 2	(2,570,319)	(8,384,618)
Year 3	3,989,284	(1,702,722)
Year 4	10,471,996	4,750,923
Year 5	16,878,443	10,983,976

Note: American Put Option – NPV reflects that reversion can occur in any holding period year.

Both the internal rate of return and the modified internal rate of return are calculated next in the DCF process. The results for the Riverside and LaSalle income properties, under the American Put Option strategy, are presented below in Table 8.

TABLE 8
INTERNAL RATE OF RETURN AND MODIFIED INTERNAL RATE OF RETURN FOR THE RIVERSIDE AND LASALLE PROPERTIES UNDER AN AMERICAN PUT OPTION STRATEGY

	Riverside		LaSalle	
Capitalization Rate (capr)	5.20%		7.50%	
Lease Term	**IRR**	**MIRR**	**IRR**	**MIRR**
Year 1	na	na	na	na
Year 2	na	na	na	na
Year 3	6.21%	6.16%	na	na
Excess of internal return over capr	1.01%	0.96%	na	na
Year 4	7.20%	7.06%	8.78%	8.66%
Excess of internal return over capr	2.00%	1.86%	1.28%	1.16%
Year 5	7.78%	7.56%	9.87%	9.59%
Excess of internal return over capr	2.58%	2.36%	2.37%	2.09%

Note: na is "not applicable" as the NPV < 0. This fact guarantees the MIRR to be < the Cap Rate.
capr = going-in cap rate
American Put Option – IRR and MIRR are calculated as if reversion can occur at the end of any year in the holding period.

A critical component of this paper is the suggestion that the investment choice can be made under an American Put Option strategy. It provides alternatives and flexibility in the decision making process. An additional positing of this paper is that the strategy is better served by implementing a MIRR technique over the traditional IRR and that stratifying the modified internal rate of return can prove to be valuable under conditions of uncertainty. The results from stratifying the MIRR for both the Riverside and LaSalle locations under an American Put Option are presented in Table 9 below.

TABLE 9
STRATIFYING THE MODIFIED INTERNAL RATE OF RETURN (MIRR) FOR THE RIVERSIDE AND LASALLE PROPERTIES UNDER AN AMERICAN PUT OPTIONS

		Riverside	LaSalle
		Stratifying the MIRR	
Lease Term			
Year 1:		na	na
Year 2:		na	na
Year 3	Relative Proportions of the MIRR		
	From Operational (NOI) cash flows	13.37%	na
	From Reversion (RV) cash flows	86.63%	na
Year 4	Relative Proportions of the MIRR		
	From Operational (NOI) cash flows	17.09%	23.98%
	From Reversion (RV) cash flows	82.91%	76.02%
Year 5	Relative Proportions of the MIRR		
	From Operational (NOI) cash flows	20.39%	27.94%
	From Reversion (RV) cash flows	79.61%	72.06%

Note: na is "not applicable" as the NPV < 0. This fact guarantees the MIRR and IRR to be < the Cap Rate.
American Put Option – based on reversion occurring at the end of any year in the holding period.

ANALYSIS OF EMPIRICAL RESULTS

Within a mutually exclusive investment situation, the decision regarding investing in either the Riverside and LaSalle income properties must be made. Choosing the property with the comparatively greater positive NPV is an accepted rule of the DCF method. In Table 7, within the five year holding period, the Riverside property offers a viable positive NPV in each of years three, four, and five in the amounts of $3,989,284, $10,471,996, and $16,878,443 respectively. The American Put Option gives the investor three viable property options during the five year holding period. During the first two years, for both properties, there is an estimated negative net present value, making the choice to sell within that period not a prudent one. For the LaSalle location, there is a positive opportunity in years four and five as year three was met with negative net cash flows. Its positive NPV in year four was $4,750,923 and in year five was $10,983,976. The property at Riverside would be favored over LaSalle as its NPV exceeds that of the LaSalle property in both years four and five. Further, the American Put strategy reveals that investors have an added one year (year three) flexibility with the Riverside property as LaSalle reports a negative NPV as opposed the positive value for Riverside.

The internal returns, the IRR and MIRR, on both income property investments are compared. The expectation is that the respective internal rates of return will be greater than the project's going-in capitalization rate and be consistent with the NPV ruling. This paper recognizes the weaknesses associated with the IRR and seeks to mitigate them with the calculated modified internal rate of return. Table 8 contrasts both the IRR and MIRR findings within the American Put Strategy. In year three, the Riverside property is the preferred investment as LaSalle's IRR and MIRR are less than its going-in cap rate. Both properties reflect IRR and MIRR values that exceed their cap rates in years four and five. In year 4, the LaSalle property's MIRR of 8.66% exceeded its cap rate by 1.16% while its IRR of 8.78% had a spread of 1.28%. Riverside's MIRR of 7.06% exceeded its cap rate by 1.86% while its IRR of 7.20% had a spread of 2.0%. During year five, LaSalle's MIRR of 9.59% was larger than its cap rate by a margin of 2.09% while its IRR of 9.87% had a spread of 2.37%. The Riverside property had a MIRR of 7.56% that exceeded its cap rate by a spread of 2.36% while its IRR of 7.78% was associated with a spread of

2.58%. It is important to note that the IRR exceeds the MIRR in each year. This is due to the fact that the MIRR delivers a more conservative return measurement. This fact is further evidenced by the relatively larger cap rate spreads associated with the IRR calculations. The IRR consistently overstates the return associated with each project making the use of the MIRR more desirable. In years four and five, the preferred investment choice is the LaSalle location as its MIRR is consistently greater than that of the Riverside property. This appears to conflict with the NPV choice which preferred the Riverside property.

Within this environment of conflicting investment decision rules, the property investor needs to be able to better measure a project's expected future cash flow risk. One method to help address the latter is the partitioning of the internal rate of return. Its objective is to gain some sense of the relative proportion of the components of the return and to view the timing and/or magnitude of a project's cash flows. However, aware of the strengths of the MIRR over the IRR, this paper extends the literature through the introduction of stratifying the modified internal rate of return. Viewing it in conjunction with other risk factors (such as office building construction exceeds market absorption or the relatively high average vacancy rates), it offers an insightful measure of the risk associated with the expected operational and reversion cash flows. Contributing to the decision process, Table 9 reports the results of stratifying the MIRR for the Riverside and LaSalle Properties under an American Put Option. As noted previously, the American Put Option reveals that the Riverside Property, exclusively, offers a viable value in year three. The relative proportion of the MIRR from the operational cash flows is 13.37% while from the reversion value is 86.63%. There is a relatively large degree of risk associated with the expected future resale value. Riverside's relative proportions of the MIRR associated with the expected resale cash flow over years four and five are 82.91% and 79.61% respectively. The LaSalle location generated relative proportions of its MIRR from the future sales price over years four and five that were 76.02% and 72.06%. The investor-buyer must be aware of the relative greater risk associated with the key reversion cash flow. The results of stratifying the MIRR over years four and five reveal a consistent pattern where the expected reversion cash flow risk of the Riverside property is greater than that of the LaSalle property. The implication is that taking into account both the NPV ruling and stratifying the MIRR, the Riverside Property is riskier than the LaSalle property as the bulk of the MIRR depends on the most unstable cash flow component, the reversion value (RV). In order to better assess the potential cash flow risks of the properties, this paper recognizes other specific risk factors in conjunction with stratifying the MIRR. Reporting relevant data from the metro Chicago area, Table 3 reports that the annualized 5-year vacancy rate was 17.6%. The LaSalle location is well below this figure with a rate of 9.2% while the Riverside property stands at 14.4%. The relatively high rate is not a good sign for the Chicago area and the Riverside property is relatively closer to this norm than LaSalle. The annualized 5-year rent growth rate is only 2.1%. That is not a strong number for either property as it implies future constraints on cash inflows. The average free rent concession for the region is 2.4 months which translates into more cash flow reductions. The region shows an approximate 2:1 ratio of the construction of office buildings relative to their absorption. For every two office buildings built only one is purchased. A possible over supply of office space may occur and this could lead to a future downward pressure on rent revenue as well as an increase in vacancy rates. The Riverside property appears to be subject to greater potential impact by these factors. The metro Chicago area shows a stability rate of approximately 68%. Stabilization is achieved when the average vacancy rates of the properties built in any given year (here, it is 2008) are equal to or less than the metro's average overall vacancy rate for the last five years. The inflation factor for the period was 3.85% which impacts a majority of the cash flow estimates in Tables 4 and 5. Given an investor's unique aversion to risk, these Table 3 influences, and the assessment of cash flow risk through stratifying the MIRR, the adherence to the traditional NPV default rule may not be as obvious or prudent for an investor to follow. The preferred property investment decision, now enhanced by stratifying the MIRR, could be directed towards the LaSalle location and not the Riverside property as dictated by the traditional DCF analysis.

CONCLUSION

In analyzing choices in income properties, the time value of money, systematic cash flows, and the ultimate resale of the property, are included in the traditional Discounted Cash Flow (DCF) method. However, it has a weakness in that it tends to be passive and does not capture the ability of the investor to adapt or revise their decisions in response to market developments. With this backdrop, this paper incorporates an American Put Option as it offers the property investor the flexibility to make choices at multiple points along the investment holding period. Traditional DCF analysis relies on both the NPV and IRR techniques with any conflict between the two being settled by choosing the project with the highest NPV. The case is made that the modified internal rate of return (MIRR) is a more stable technique than the IRR as it delivers a conservative return, handles a sequence of positive and negative cash flows, and specifies the project's cap rate as the reinvestment rate. In each of the last three years of the holding period (neither property offers a viable option in the first two years) the IRR consistently overstates the return and hence understates the relative risk as compared with the MIRR. The literature is extended by stratifying the MIRR into two primary cash flows strata, the cash flow streams from operations (NOI) and reversion (RV). In years four and five of the holding period, the Riverside Property's relative proportion of the MIRR from reversion cash flows was 82.91% and 79.61% while the LaSalle location had a comparative proportion of 76.02% and 72.06%. Investors in Riverside face a relatively greater risk. Critical economic factors from the metro area such as average regional vacancy rates, rent growth rates, free rent concessions, and the ratio of office building construction to absorption influence the capital budgeting decision bringing the default NPV selection of the Riverside property into question. Stratifying the MIRR provides a practical improvement over reliance on the IRR and offers an important layer of risk analysis that facilitates project comparisons even where technique choices lead to conflicting results.

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