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# Tax Policies that Encourage Tenant Medical Office Building Green Utility Retrofits

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## Abstract

This paper exams the financial impact of upgrading an existing medical office building with an energy efficient design or equipment from a tenant/lessee perspective. The empirical study highlights the importance of utility cost, credit availability and producer price index for office construction on the amount of medical office building spending put in place. The independent variables prime interest rate, cost of natural gas per therm and electricity cost per KWH are significant variables. A cost-benefit model is developed that inputs several personal income tax rates, incorporates a debt-service coverage ratio, analyzes investment tax credit and rebate scenarios and varies the level of energy savings. The cost-benefit case study results provide insight into which factors enable higher net construction spending when considering a green energy retrofit project. Both the regression model and the case study model focused on the tenant who rents medical office space using a triple net lease. The tenant paradigm limits the analysis to energy savings, the tax implications of having these savings and benefits associated with borrowing when financing the green retrofit. The availability of low cost borrowing and increased investment tax credit (ITC) rates increases net retrofit construction spending.

## Introduction

Medical practices occupy medical office space rented using a triple net lease. Under this type of lease the medical practice pays the electricity, water and natural gas bills, real estate taxes and maintenance expenses associated with operating the property. Increases in these expenses reduces profitability. Upgrades to the property under most net leases is the tenant's responsibility during the term of the lease. The owner of the building does not compensate the tenant for building upgrades. The medical practice attempts to minimize the cost associated with using the occupied space in order to increase the overall profitability of the group. Factors that need to be considered by the tenant prior to doing a building energy retrofit include loan availability, investment tax credits plus energy rebates provided by utility companies and the cost of the construction retrofit. Replacement decision analysis compares the additional cost associated with the retrofit to the marginal revenues generated by the green upgrade.

Green retrofits to equipment and the structure can be internally financed or a loan can be secured for the upgrade. Commercial lenders and the small business administration (SBA) offer green loans to tenants of buildings. The credit worthiness of the borrower serves as collateral for the retrofit green loan. Commercial loans can be secured using the expected investment tax credit that will be paid by the federal government as collateral. The Small Business Administration (SBA) under loan program 504 makes loans to tenants of buildings for improvements made for the leased facility. The loan rates fluctuate monthly and can have terms of up to 10 years with a 10 percent down payment. The applicant needs to demonstrate that the green retrofit reduces energy utilization by 10 percent. This loan is an example of the type of lending available in the market place. Medical office buildings may not qualify for this specific loan, but other lenders offer similar loan arrangements. The important aspect of this lending example is that the loan rate continuously fluctuates with the prime interest rate and lending for an energy retrofit can be secured for a period of 10 years.

The Debt Service Coverage Ratio in the context of this paper compares the Net Energy Savings generated by the retrofit to the annual payment on the loan. This ratio for an office building can vary from 1.22 to 1.25. Higher numbers reduce the amount on the loan that a lender will underwrite. Using the accounting balance sheet formula where assets are equal to the loan plus owner equity, a reduction in the loan amount reduces spending on the energy efficient asset being purchased. The availability of cheap and available credit make the private decision to purchase energy efficient assets more likely.

The business energy investment tax credit was originally signed into law in 2005 and took effect in January of 2006. It has been annually renewed. The Consolidated Appropriations Act signed in December 2015 provides for a 10 or 30 percent tax credit on specific energy technologies starting in 2016. The issue addressed by this paper, is whether tax credits and utility rebates at high levels are likely to provide the necessary incentive mechanism to spur the adoption of energy efficient technologies in medical office buildings by a tenant occupant.

## Literature Search

Energy Star is a federal government agency rating system. Score for facility space used to provide services for medical, dental and psychiatric outpatient care. A statistical analysis of the respective medical office building is performed and the actual energy use by the building yields a 1 to 100 percentile ranking for energy consumption relative to a national norm. The U.S. Department of Energy collects national norm data for medical office buildings. Energy Star is a federal government rating system.

Research studies have compared Energy Star ratings to rankings assigned by Leadership in Energy and Environmental Design (LEED). Scofield study (2013) examined 2011 energy data for 953 New York City office buildings. Twenty-one (21) of the buildings were certified by LEED. The study found that LEED-certified and non-LEED certified building used the same amount of energy and generated the same level of greenhouse gases. The results of this study cast doubt of the use of Energy Star scores as a good measure of energy success. The author concluded that the Energy Star ranking system used as a benchmarking tool of energy usage requires validation. The Scofield study (2014) specifically studied the Energy Star rating system for Medical Office Buildings. It reviewed energy models used to assign Energy Star rankings and the data used in building these models. This study found that the Energy Star scores produced by the models being used had little credibility.

Hiser and Baker (2011) studied the costs and benefits associated with the Energy Star and LEED building labels for existing buildings. The hypothesis of the study was that Energy Star ratings are a better overall investment rating for real estate owners as compared to commercial buildings with a LEED rating. This hypothesis was not reject. The rated office building was compared to the typical office building and CO2 emissions and the emission abatement percentage was determined. Energy Star and LEED standards result in energy savings an average carbon emission reduction of 25.8 percent. This study developed income statements using different utility expense reduction scenarios to calculate the likely change in the property's appraised value.

The U.S. Green Building Council the creator of the LEED-certification ratings, a private for-profit group, in a 2015 article indicated that LEED-certified buildings have lower operating costs when compared to non-LEED buildings. LEED certified buildings used 25 percent less energy and resulted in a 19 percent reduction in aggregate operating costs. Information about attracting tenants, building sell-asking price differences, increased worker satisfaction, higher rental rates were also presented as advantages for having a LEED-certified building.

## Empirical Study

The objective of the empirical study is to determine whether medical office construction spending is influenced by electricity and natural gas prices and the prime interest rate. Is investor behavior considering energy efficient construction influenced in a predictable manner by the cost of available credit and by utility expenses especially those related to natural gas rates and electricity rates? It is assumed that newer construction is more energy efficient than existing older construction. Technological changes continuously improve the efficiency of heating furnaces, air conditioning compressors, computers/equipment, lighting, windows and insulation. Newer buildings would incorporate more of the latest energy efficient designs.

The regression variables selected were those that influence the tenant of an office building subject to a triple net lease. Rent per square foot, vacancy rates and resale value appreciation or depreciation rates were not included in equation 1, because these factors directly influence the owner of the medical building's profitability not the tenant retrofit decision. The medical practice is responsible for utility bills and upgrades done to the building during occupancy. These upgrades can be financed by using internal cash flows or by securing a loan for the retrofit. The unemployment rate indirectly influences internal cash flows or demand for medical services due to loss of medical insurance coverage; and for this reason the unemployment rate variable was included in the regression analysis. Under a net lease the tenant pays utility bills and upgrades to the building while the lease is in effect. The owner of the property normally does not compensate the medical practice for improvements made to the building during tenancy.

The regression used the monthly dollar amount of medical office construction put in place for medical office buildings as the dependent variable (Y) for years January 2000 through December 2015. This medical construction information and other cost variables are available online from the U.S. Bureau of Labor Statistics. The monthly prime rate is published online by J. P. Morgan Chase. The independent variables were the prime interest rate, cost of gas and electricity, producer price index for medical office services and the unemployment rates. The unemployment rate affects demand for medical services while the other independent variables influence the costs of providing medical care in a medical office setting. The regression was linear and specified as:

$$Y = C - b_1 PRIME + b_2 GAS + b_3 ELECTRICITY - b_4 UNEMPLOYRATE - b_5 PPImedoffice + e_t \quad (1)$$

It explained 58 percent of the variation in the amount of medical office construction spending put in place during the 15 year time period. The prime interest rate (PRIME) coefficient was negative indicating that as rates fell during the period the amount of construction spending rose. Many construction loans are tied to the prime rate and the interest rate charged to the borrower fluctuates as the prime rate changes. Utilities had positive coefficients. New construction put in place was positively influenced by increases in electricity cost per kilowatt hour and natural gas cost per therm. As the unemployment rate (UMEMPLOYRATE) rises, given that approximately 50 percent of population get their health insurance coverage through employer plans, then the income of medical providers is expected to fall due to lower demand. The amount of new medical office construction needed would be expected to fall. The variables prime, gas per therm and unemployment rates have confidence levels of 99 percent. Electricity per KWH was significant at a 5 percent level. Higher energy prices directly encourage new medical office construction. The negative variable sign for producer price index medical office building (PPImedoffice) indicates that the higher the cost of providing medical services to patients, the lower the amount spent on new construction spending. This variable has a probability of 16.5 percent which indicates the variable is insignificant.

## Table 1: Regression Result

Dependent Variable: MEDOFFICECPUT
Method: Least Squares
Date: 03/21/16 Time: 09:52
Sample: 2000M01 2015M12
Included observations: 192

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 540.1566 | 191.4594 | 2.821259 | 0.0053 |
| PRIME | -22.53508 | 4.719669 | -4.774715 | 0.0000 |
| GAS | 416.7463 | 33.02062 | 12.62079 | 0.0000 |
| ELECTRICITY | 2374.043 | 1135.863 | 2.090078 | 0.0380 |
| UNEMPLOYRATE | -29.07058 | 4.843915 | -6.001463 | 0.0000 |
| PPIMEDOFFICE | -3.120637 | 2.238812 | -1.393881 | 0.1650 |

| | | | |
|---|---|---|---|
| R-squared | 0.580031 | Mean dependent var | 551.0260 |
| Adjusted R-squared | 0.568741 | S.D. dependent var | 115.6087 |
| S.E. of regression | 75.92054 | Akaike info criterion | 11.52800 |
| Sum squared resid | 1072091. | Schwarz criterion | 11.62980 |
| Log likelihood | -1100.688 | Hannan-Quinn criter. | 11.56923 |
| F-statistic | 51.37796 | | |
| Prob(F-statistic) | 0.000000 | | |

All of the statistical data can be accessed online at the respective federal agency websites and commercial websites. The regression results suggest that the cost of energy and credit influence medical office building construction spending in a predictable manner.

## Case Study

The case study is designed from a medical practice perspective. The practice is renting 5,000 feet of office space using a triple net lease. The medical group is considering upgrading an energy inefficient feature of the building. Making the retrofit will reduce energy costs by either: 10, 20, 30 or 40 percentage. An income statement is generated using rates noted in the article Trends in Office Building Operations 2011.

Federal personal tax brackets for 2015 are used in the model and range from 10 to 39.6 percent. A state income tax of 6 percent (i.e., tax rate charged in Georgia) is added to the federal income tax brackets making the combined tax rate range 16 to 45.6 percent. The tax deductibility of state taxes on federal returns was not modeled. Higher marginal income tax brackets make purchasing retrofitted energy saving features cheaper. The government is paying a larger percentage of the construction cost associated with the retrofit for higher income tax rates than for lower tax brackets.

An investment tax credit (ITC) is taken and rebates received almost immediately lowering the net cost of the new green construction retrofit. It is assumed to be a percentage of the construction cost ($\%\Delta C_0$). The retrofit energy upgrade is depreciated using a 10-year straight-line method; and the lease will be in effect for at least 10 years. The tenant is not compensated by the medical office building owner for any improvements made to the property. As a consequence, the salvage value of the retrofit equals zero. It is a simple interest loan and the initial loan amount is owned at the end of 10 years. The energy improvement is expected to operate economically for 10 years after installation.

Equations 2 and 3 are based on the balance sheet accounting identity: Assets = Liabilities + Equity. The asset is the value of the new green construction, the loan associated with the retrofit is the liability and equity is defined as the present value of the tax adjusted energy savings and tax adjusted depreciation expense deduction.

The equations also incorporate the concept of the incremental cost. To be feasible, the net construction cost associated with green retrofit construction ($\Delta C_0 - ITC_0$) needs to be less than or equal to the incremental benefits associated with the green retrofit. Decreases in utility expense variable ($\Delta E_t$) is a direct result of doing the green retrofit and enhances profitability.

The availability of lending especially at low interest rates increases the likelihood that new green construction is feasible. The Debt Service Coverage Ratio is set at 1.22 and the capitalization rate is 7.70 percent as reported by A. Cross (2015). The discount rate is the return required by the tenant. The lender receives the interest income as compensation for making the loan. The tenant or medical practice is assuming the risk that the retrofit will perform as advertised and will continue to save energy at the advertised rate for the next 10 years. The risk premium earned by the tenant is 4.20 percent the difference between the prime loan rate of 3.50 percent and the required return of 7.70 percent. A lower debt service ratio makes doing a green retrofit more feasible. The case study will use a Debt-Service ratio of 1.22. The right hand of the equation will be solved under different scenarios to determine the likely financial rewards associated with the retrofit. From a feasibility standpoint, the maximum financial benefit determined sets a ceiling on the amount that can be spend on the retrofit unless the retrofit is being mandated by a government entity. The adjustment (1 - %) indicates that taking an ITC lowers the amount the retrofitted asset can be depreciated during year 1 through year 10. A 10 percent ITC would reduce the basis for depreciation to 90 percent (100% - 10%).

$$\Delta C_0 - ITC_0 \leq \Delta L_0 + \sum_{t=1}^{n} [ (PV\Delta E_t - PV\Delta I_t)(1 - t_p) + PV(M^{-1}(1-\%)\Delta C_0)t_p] + (PVS_n - PVL_n) \qquad (2)$$

Equation 3 sets the ITC equal to a percentage of the construction cost incurred due to undertaking the green retrofit. $PV(M^{-1}(1-\%)\Delta C_0)t_p$ represents the tax benefits from taking a depreciation write-off when determining an individual's tax liability. Lower utility expenses does not include the benefits associated with deducting depreciate expense when determining tax liability.

$$\Delta C_0 - \%\Delta C_0 \leq \Delta L_0 + \sum_{t=1}^{n}[(PV\Delta E_t - PV\Delta I)(1 - t_p) + PV(M^{-1}(1-\%)\Delta C_0)t_p] + (PVS_n - PVL_n) \qquad (3)$$

The Gross Potential Income shown in Table 2 is calculated for an urban medical office building using data published by IREM. The vacancy rate, utility expenses and other costs per square foot where available for the year 2011. Utility costs for the median office building located in an urban area in the United States was $2.20 per square foot of rentable space. The cost was higher for the urban area than the suburban area estimates. The Net Operating Income earned varied depending on the urban-suburban settings and location within the country.

## Table 2: Reference Income Statement: Urban Location

| | | |
|---|---|---|
| **Gross Potential Income 5000' x $20.30'** | | **$101,500** |
| **Less: Vacancy Losses (1-.91)*** | | **9,135** |
| **Effective Gross Income** | | **$ 92,365** |
| **Operating Expenses:** | | |
| **Utilities $2.20'** | **11,000** | |
| **Janitorial/Maintenance $2.65'** | **13,250** | |
| **Administrative/Benefits $1.17'** | **5,850** | |
| **Insurance $1.26'** | **6,300** | |
| **Real Estate & other taxes $2.62** | **13,100** | |
| **Less: Total Operating Expenses** | | **49,500** |
| **Net Operating Income ($9.90')** | | **$ 42,865** |

*the median U. S. medical office building occupancy rate is 91%

Energy savings are based on the initial reference income statement amount of $11,000. For example, a 10 percent saving results in an annual reduction of $1,100 ($11,000 x .10). Since this is a replacement of equipment or a retrofit to the existing building example a reduction in local real estate taxes is unlikely. Many cities lower real estate taxes owed for a period of time, but this tax advantage is normally available for new construction and not for changes to existing buildings. Local utility companies frequently give rebates for installing furnaces and other equipment that meets certain minimum energy standards. These rebates should be added to the ITC in equations 2 and 3.

Table 3 shows the total dollar amount generated by altering the level of the energy savings, ITC percentages and personal federal plus state income tax rates. Total dollar energy savings and per square foot amounts are indicated. The total savings figure shows how much can be spent on an energy building retrofit that lowers utility bills. Spaces with smaller or larger square footage using the same costs per square foot estimates and other assumptions would result in the same energy savings per square foot as those indicated in table 3. The table serves as a reference template when using the square footage amounts. It cross references expected energy savings with income tax rates and the available ITC + rebate rate.

**Table 3: Tax Rates, ITC+ Rebate Percent, Income Tax Rates and Energy Saving**

**Energy Savings**

| t=16%,ITC | 10% Total | 10% SQ’ | 20% Total | 20% SQ’ | 30% Total | 30% SQ’ | 40% Total | 40% SQ’ |
|---|---|---|---|---|---|---|---|---|
| 16%, 0% | $17,791 | $ 3.56 | $35,583 | $7.12 | $53,374 | $10.67 | $71,166 | $14.23 |
| 16%, 10% | 19,768 | 3.95 | 39,537 | 7.91 | 59,305 | 11.86 | 79,073 | 15.81 |
| 16%, 20% | 22,239 | 4.45 | 44,479 | 8.90 | 66,718 | 13.34 | 88,957 | 17.79 |
| 16%, 30% | 25,416 | 5.08 | 50,833 | 10.17 | 76,249 | 15.25 | 101,665 | 20.33 |
| 16%, 40% | 29,652 | 5.93 | 59,305 | 11.86 | 88,957 | 17.79 | 118,610 | 23.72 |
| t=45.6%,ITC | 10% total | 10% SQ’ | 20% Total | 20% SQ’ | 30% Total | 30% SQ’ | 40% Total | 40% SQ’ |
| 45.6%, 0% | $20,540 | $ 4.11 | $41,079 | $8.22 | $61,619 | $12.32 | $82,158 | $16.43 |
| 45.6%, 10% | 22,822 | 4.56 | 45,644 | 9.13 | 68,465 | 13.69 | 91,287 | 18.26 |
| 45.6%, 20% | 25,674 | 5.13 | 51,349 | 10.27 | 77,023 | 15.40 | 102,698 | 20.54 |
| 45.6%, 30% | 29,342 | 5.87 | 58,685 | 11.74 | 88,027 | 17.61 | 117,369 | 23.47 |
| 45.6%, 40% | 34,233 | 6.85 | 68,465 | 13.69 | 102,698 | 20.54 | 136,930 | 27.39 |

The marginal benefit per square foot ranges from $3.56 to $27.39. The higher the marginal income tax bracket the higher the amount that can be spend on green retrofit construction. The rows on the chart follow a pattern. Every 10 percent increase in energy savings causes the amount per square foot to grow at a constant rate. For example, the 10%SQ’ coupled with 16%, 0% grows at a constant rate of $3.56. The overall energy rate of growth at 16%,0% is 300% ($14.23-3.56/3.56). The columns of the chart show a direct relationship exists between the level of ITC and rebate levels and the amount that can be spend on new construction. The overall growth rate is 66.6 percent for all columns and exists for all marginal income tax brackets.

Relative contributions to energy savings can be determine by comparing: the percentage change in construction spending to the percentage change in the change in the energy level or the percentage change in the ITC rate. A higher index ratio number indicates a higher energy savings impact from the variable in the denominator. For the rows the index number of 7.5 (300%/40%) indicates the multiplier effect associated with increased energy savings. The index number of the columns is 1.665 (66.6%/40%) for the multiplier effect on a given level of energy to changes in the investment tax credit levels. Changes in energy saving rates is the largest factor generating revenues for retrofit construction spending.

## Conclusions

The empirical and case studies indicate that new retrofit construction and new construction spending in medical office buildings is sensitive to utility expenses. The tenant has a financial incentive to purchase more energy efficient heating/cooling systems or to rent a green office space and pay a higher rent per square foot. New retrofit construction depending on the availability of tax credits and utility company rebates, energy savings level and marginal income tax rate ranged from a low of $3.56 to a high of $27.39 per square foot. According to 2016 New Furnace Installation Cost and adjusted by brand/efficiency levels purchasing and installing a new natural gas furnace costs between $1.98 and $5.15 per square foot. These replacement furnace costs are lower or within the numbers shown in Table 3. The total dollar energy savings shown in Table 4 for the tax bracket 16 percent ranged from $17,791 to $118,610 and for the tax rate 45.6% ranged from $20,540 to $136,930. These saving levels are sufficiently high enough to enable targeted system retrofits.

The medical practice has a choice of retrofitting an office space that they currently occupy or renting a greener office space. A 2015 research study by Devine and Kok indicates that environmentally friendly office buildings earn higher rents and have lower vacancy rates.  This would suggest that tenants are sensitive to the impact of energy costs on their bottom line and may opt to relocate to newer or existing green retrofitted buildings.

ITC and utility rebates encourage retrofitting furnaces, air conditioning compressors and appliances but this may be happening at the end of the existing equipment's useful life. The results shown on Table 3 indicate that the financial incentive to shift to energy efficient equipment is greater than taking advantage of a rebate or ITC. An upfront financial incentive probably encourages slightly earlier retrofit changes that were already planned to occur in the near future.

Higher marginal income tax rates incentive encourage retrofitting for a tenant occupant.  The difference in square foot savings existing between a tax rate of 16 percent and 45.6 percent is approximately 15 percent for the respective energy saving levels for the same ITC + rebate level.  The progressive nature of the federal personal income tax schedule encourages tenant green medical office building retrofits.

Green upgrades either by the medical building tenant or owner user of the building is encourage by high and increasing utility prices.  This incentive is reduced when energy prices are lower or falling.  The energy saving factor would become less financially important and the tax credits and utility rebates become the primary incentives encouraging green retrofits.

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