Effect of past crises (economic and others) on US downtown office property income and expenses

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Abstract

The paper studies the effect of past recessions/crises (hyper-inflation periods, financial & oil crises, terrorism etc.) on average rental income, operating expenses and taxes of downtown office building across the US. The real estate data were gathered from the BOMA Experience Exchange Reports (1960 through 2008) and include two distinct building groups (300,000 to 599,999 sf and more than 600,000 sf). This dataset was then supplemented with economic and other factors from multiple public/government databases. Two different methodologies were applied with the goal of understanding: a) the effect of economic/other factors on the aforementioned variables and b) the underlying cyclicality patterns which aid in the prediction of future trends until 2020. The results indicate that increases in the square feet/worker affects all variables and recessions have a lasting effect on operating expenses and taxes of the smaller group of buildings. Increases in crude oil prices also seem to decrease the income of both building groups. The cyclicality modeling reveals 19 to 25 year cycle for income, expenses and taxes of both groups, with a decrease of income levels being predicted until 2011 and a peak estimated for 2016. In contrast, operating expenses and taxes are expected to increase especially after 2012.

Introduction

Economic, real estate, oil and other crises can cause significant lack of confidence and recessions, which eventually affect office markets. Being in the midst of a financial crisis makes this paper timely because it studies past crises and their effects on downtown office market trends across the US. This retrospective look of past crises and their effects on office markets is pivotal in the estimation of current short and medium-term market responses.

A series of researchers analyze the various causes and effects of past crises; among them, Blomberg and Hess (2002) who looked at the relationship between recessions and internal as well as external conflicts in a large sample of countries (152) from 1950s to 1992; they concluded that the risk of conflict increases after a recession. Blanchard and Galf (2007) explored the difference

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in the effect of oil price shocks in the 1970s compared to 2000s and their effect on industrialized economies. Roubini and Setser (2004) outlined the effect of oil price shocks on the economy and the triggering of US/global recessions. Other researchers focused on the economic systems rather than commodities or conflict; among them, Bordo and Landon-Lane (2010) studied the US business cycles from 1920 to 2007 and the effect of different monetary policies after each crisis. Reinhart and Rogoff (2009) focused on the aftermath of economic crises worldwide after World War II. Tobias and Shin (2008) provided insight in the banking sector and the effect of cyclicality, leverage and liquidity. Franklin and Gale (2000) looked at past asset bubbles and financial crises. Balke and Fomby (1994) focused on 15 post-World War II macroeconomic time series and the effects of small and large shocks and the effect of outliers. Barker (1995) in his book had a different approach by focusing on the relationship between the long-term Kondratieff cycles and war patterns, banking crises, real estate and other trends. An additional body of research focused more on the real estate markets. Zandi (2009) described the various policies and problematic oversight, which led us to the current financial crisis reviewing the residential market trends as well as ways to move forward. Downs (2009) analyzed the causes of the current financial crisis looking at both residential and commercial markets. Herring and Wachter (1999) looked at real estate cycles, prices and the relationship with banking crises at an international level as did Quigley (1999) although he focused on housing prices. An earlier series of papers looked at the effect of corporate and economic events on stock returns of real estate lenders during the crisis of 1989 to1991 (Ghosch, Guttery and Sirmans (1997), Capozza (1994), Fergus and Goodman (1994), Hendershott and Jane (1992)). He, Myer and Webb (1996) also documented the real estate crisis of 1989 to1991. Wheaton (1999) focused at the real estate cyclical behavior, not from an external crisis perspective but from market equilibrium through supply and demand trends.

This paper analyzes a unique dataset, which combines economic and office market variables from 1960 through 2008. Using the trends experienced throughout this period a prediction until 2020 is made on future average income, operating expense and tax levels of sizable downtown office buildings (300,000 to 599,999sf and more than 600,000sf) using two different methodologies. The first is a standard OLS method and the second is cycle theory with the use of Fourier Analysis. The study of previous recessions offer significant insight in the reaction time of the office market, providing the benchmark we need in the estimation of future trends until 2020.

Data and structure

The paper utilizes data from multiple sources, which are classified in two distinct groups for a period of 48 years, with the study length (1960 through 2008[1]) being determined by the office market time series availability. The *Real Estate dataset* captures trends only among downtown private office properties grouped in buildings between 300,000 to 599,999sf and those with more than 600,000sf. The specific data fields studied were: average office rentable income[2]/sf, average office operating expenses[3]/sf and average taxes/sf, sf/worker, number of observations. The data were gathered from the BOMA/International Experience Exchange Reports in collaboration with BOMA/Chicago. The *Economic dataset* includes the following data fields: unemployment rate (Bureau of Labor Statistics(BLS)), GDP (Bureau of Economic Analysis), average crude oil prices (Inflationdata.com), value of outstanding commercial property mortgage debt (Executive office of the President), US treasury yields (Executive office of the President), Bank prime rate (Executive office of the President), annualized Dow Jones Industrial Average (DJIA – throughout the study period) – Standard & Poor's (S&P 500– throughout the study period) – Nasdaq (from 1971) (Executive office of the President) and recessions (National Bureau of Economic Research (NBER)). Beyond the data gathered, two more variables were generated: a) recession-lag1 is a dummy variable which takes the value 1 one year after the recession commences and maintains it for the number of years NBER has specified; otherwise it takes the value zero, and b) recession-lag2 which is also a dummy variable, which takes the value 1 two years after the recession commences and maintains it for the number of years NBER has specified; otherwise it takes the value zero.

The study period from 1960 through 2008 includes seven recessionary periods (based on NBER), which are:

- 1960-61: Monetary recession (after interest rate increases in 1959)
- 1969-70: Financial recession (rising inflation, increased deficits and increasing interest rates)
- 1973-75: Quadrupling of oil prices by OPEC and spending led to stagflation,
- 1980-82: Energy crisis & interest increases to fight inflation
- 1990: Inflation pressures, S&L crisis (weak recession)
- 2001: Dot.com crisis (2000) and terrorist attacks of September 11, 2001
- 2008: Subprime crisis

A first overlay of the NBER declared recessions on the office market data provides some initial insight on the reaction of the office markets during this 48 year period (Exhibit. 1 through 3). The

[1] Due to missing real estate reports there were three years which were dropped 1973, 1976 and 2000
[2] Income includes: office area rental income
[3] Operating expenses include: all cleaning, repairs/maintenance, utilities, roads/grounds, security and administrative expenses for the office rentable area

data indicate a diminishing difference in average income levels between buildings with more than 600,000sf compared to those with 300,000-599,999sf after 2000, especially when the latter group accomplishes a higher average income/sf for the first time throughout the study period (Exhibit. 1). A number of speculations can be made for this effect (e.g. new office construction in downtown areas is more likely to be less than 600,000sf, larger downtown office stock is likely to be old with a decreasing rental rate competitiveness compared to newer properties etc.), but the data structure does not allow a more in depth analysis. Operating expenses (Exhibit. 2) for both groups of buildings decreased in the mid 1970s due to the energy crisis, with the decrease in the late 70s and early 80s becoming more pronounced due to the additional inflation pressures, which led owners/managers to do three things: 1) improve a building's energy efficiency and increase automation by decreasing also management personnel, 2) move from "Gross" to "Net" leases and 3) introduce rent escalations. In contrast to Exhibit.1 and 2, Exhibit. 3 shows more pronounced evidence of cyclicality with similar oscillations between the two groups of buildings, but with larger differentiation periods (1970 to1980 and 1988 to 2004) between the two groups.

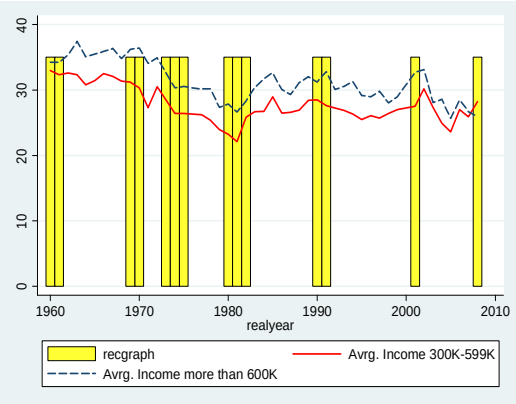


Exhibit 1. Recessions & Average Income levels

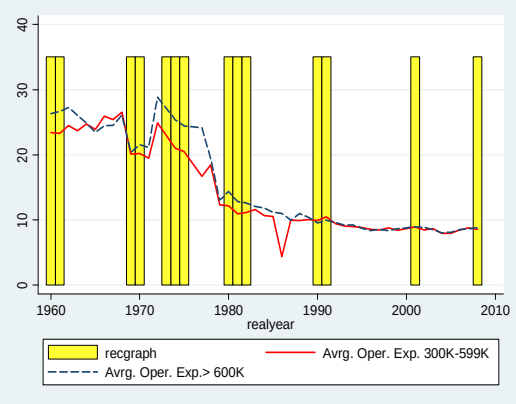


Exhibit 2. Recessions & Average Operating Expenses

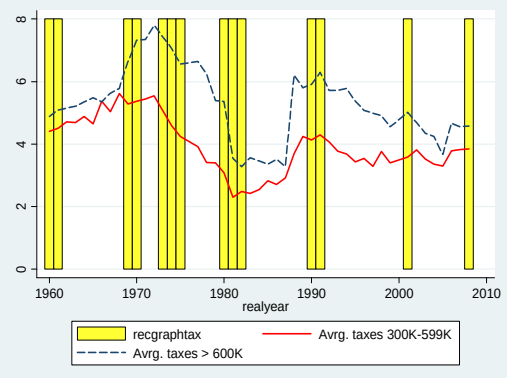


Exhibit 3. Recessions & Average Tax trends

Methodology

The effect of financial crises on real estate markets and vice versa has been mainly studied with the use of regression modeling (Herring and Wachter, 1999; Quigley, 1999; Ghosch, Guttery and Sirmans, 1997; He, Myer and Webb, 1996; Fergus and Goodman, 1994; Hendershott and Jane,1992). The goal of this paper is to study the effect of any type of designated recessionary (monetary or not) period on US downtown office markets in a span of almost 50 years (1960 to 2008), with the use of two distinctive approaches. The first method applied is a OLS regression model weighted by the number of observations. The second method is a Fourier Spectrum analysis for unevenly[4] sampled data. Both approaches are applied for each of the three dependent variables (Average Rental Income per Square Foot, Average Operating Expenses per Square Foot and Average Taxes per Square Foot). The OLS model used is (Equation 1):

$$Log(Y_i)\sqrt{n_i} = a_0\sqrt{n_i} + a_1 une\sqrt{n_i} + a_2 br\sqrt{n_i} + a_3 cmd\sqrt{n_i} + a_5 sfw\sqrt{n_i} + a_6 re_i\sqrt{n_i} + a_7 re_{i+1}\sqrt{n_i} + a_8 re_{i+2}\sqrt{n_i} + a_9 co\sqrt{n_i} + \epsilon_i\sqrt{n_i} \quad \text{Eq. 1}$$

Where:

Y: takes the values of average office area rental income/sf, average office area operating expenses/sf and average taxes/sf for properties either with 300K to599K or more than 600K

n_j: n is the number of properties per year with i taking values from 1960 to 2008

une: is the annual average unemployment rate at year i

br: is the annual average Bank Prime Rate

cmd: is the outstanding Commercial Mortgage Debt in billions of dollars

sfw: is the annual average square feet per worker

re_i: is a recession dummy (as described in the data section)

re_{i+1}: is a recession dummy lagging 1 year from the recession beginning (as described in the data section)

re_{i+2}: is a recession dummy lagging 2 years from the recession beginning (as described in the data section)

co: is the annual average crude oil price

ϵ_i is the error term

All OLS regressions were followed by test of multicollinearity and residual autocorrelation, which did not indicate any problems with the models used.

In contrast to the first approach, where the focus was on the effect of specific independent market based variables on the three dependent variables; the second approach focuses only on the dependent variables through time. The goal of this approach is to determine the cyclicality of the average income/sf, operating expenses/sf and taxes/sf, which if observed can help predict future trends (through 2020) due to the lengthy time-series. The methodology applied in this case is spectral analysis with the use of a Fast Fourier decomposition algorithm. Praetz (1979) applied spectral analysis on stock prices and revealed the existence of cycles, while Nerlov (1964) and Granger (1966) were among the first who applied cross-spectral techniques on

[4] Due to missing real estate reports there were three years which were dropped 1973, 1976 and 2000

economic data, while searching for short and long cycles. Pyhrr and Born (2005) highlighted the different mathematical elements of a cycle, although they did not apply spectral analysis. Before proceeding with the non-linear Fourier decomposition algorithm an underlying cubical trend was identified and removed (detrend) in all three cases to clean the dataset. The Lomb-Scargle (Scargle, 1982) algorithm was used to generate the periodogram due to the missing values. The Lomb-Scargle normalized periodogram applied is described with Equations 2 through 6:

Mean: $\bar{\mathrm{h}} = \frac{1}{\mathrm{N}}\sum_{\mathrm{i}=1}^{\mathrm{N}} \mathrm{h_i}$ Eq.2

Variance: $\sigma^2 = \frac{1}{N-1}\sum_{i=1}^{N}(h_i - \bar{h})^2$ Eq. 3

For angular frequencies $\omega = 2\pi f > 0$, we compute a time-offset τ of:

$$\tan(2\omega\tau) = \frac{\sum_{i=1}^{N}\sin(2\omega t_i)}{\sum_{i=1}^{N}\cos(2\omega t_i)}$$ Eq. 4

$$P_N(\omega) \equiv \frac{1}{2\sigma^2}\left\{\frac{[\sum_{i=1}^{N}(h_i-\bar{h})\cos[\omega(t_i-\tau)]]^2}{\sum_{i=1}^{N}cos^2[\omega(t_i-\tau)]]} + \frac{[\sum_{i=1}^{N}(h_i-\bar{h})\sin[\omega(t_i-\tau)]]^2}{\sum_{i=1}^{N}sin^2[\omega(t_i-\tau)]]}\right\}$$ Eq. 5

Where:
N is 48 (from 1960 to 2008)
h is takes the values of average income/sf or average operating expenses/sf or average taxes/sf for the corresponding N
f is the frequencies considered
τ is a constant

The scatter plot indicated that amplitudes were not constant (un-damped) in all cases but decreased (damped) in some case as X (years) increased. This effect required some sinusoidal models to be un-damped (Equation 6) and others damped (Equation 7):

$$Y_t = A * \sin(2 * \pi * \omega * t + \phi)$$ Eq. 6

$$Y_t = A * \exp(-k * t)\sin(2 * \pi * \omega * t + \phi)$$ Eq. 7

Where
Y: takes the values of average income/sf, average operating expenses/sf and average taxes/sf for properties either with 300K-599K or more than 600K
t = the year 1960 to 2008,
A = the amplitude = half of the vertical distance between the top of the peak to the bottom of the trough
π=3.14,
$\omega = \frac{1}{\mathrm{T}}$ = frequency , T= period = the time for a wave to travel a distance of one wavelength L (horizontal distance between successive peaks or troughs)
ϕ is the phase angle difference between the wave $A * \sin(2 * \pi * \omega * t + \phi)$ and the wave $A * \sin(2 * \pi * \omega * t)$
k is a first order rate constant

Results

The results of the OLS regression models provide interesting insights on the effect of the independent variables on all three dependent variables (Exhibit 4). There are commonalities and differences between the two building groups (300,000sf to 599,999sf and more than 600,000sf)

which will be highlighted in this section. Exhibit 4 - column 1 (properties between 300,000sf to 599,999sf (300K-599K)) – indicates that an increase in the bank prime lending rate, square feet per worker (sf/worker) and crude oil prices are associated with a decrease in the office area rental income. More specifically, the increase in the bank prime rate has a 0.8% negative effect on office area rental income. This result is expected because the increase in the prime rate can prevent buildings to service their debt easily with additional loans, which can lead to very limited renovations and/or upgrades causing a decrease in the space competitiveness in the market. Tenant Improvement allowances might also decrease, which can also affect the space competitiveness and therefore income levels in a similar way. An increase in the avrg. sf/worker has a similar negative effect on the avrg. income/sf (0.1%); in this case, as the space/worker increases (Exhibit 5) the automation and hotelling steers tenants to lease less space overall than in the past, which decreases a building's office space utilization. In recent years older office buildings with inefficient floor plates have become more creative with the underutilized space by transforming it to conference rooms and exercise facilities, in an effort to capture some of the lost income, with mixed results. The only other negative effect on rental income is caused by the increase in avrg. crude oil prices (0.2%), which is also expected because the cost of goods and services increases, which in turn decreases income levels. The rental income increases with an increase in commercial mortgage debt and during a recession year. The commercial mortgage debt effect might be an indication that investments made towards the improvement of a property can trigger increasing property competitiveness in the market and potential income. The income increase during recessionary years (by 4%) was unexpected[5], but it might be caused by: a) the timing the survey took place (office market conditions lag behind significant economic shifts); b) the increased likelihood of tenants extending their lease during those years, which is a cheaper short-term solution compared to moving to another property and therefore incurring the cost of the built-out and move. Exhibit 4 – column 2 (more than 600,000sf (>600K)) – results are identical to those of column 1 on the effect of avrg. sf/worker and crude oil prices, but none of the other independent variables are statistically significant.

Exhibit 4 – column 3 (300,000sf-599,999sf) – results indicate that an increase in the unemployment rate, bank prime lending rate, commercial mortgage debt and avrg. sf/worker are associated with a decrease in the average operating expenses. An increase in the unemployment rate is associated with a 20% decrease in operating expenses due to the competition among building suppliers, which decrease costs levels. The increase in the avrg. sf/worker decreases the operating expenses by 0.3%, which is expected because of the smaller number of individuals

[5] Income is reported on 100% occupancy, so the vacancy increases during recessions and therefore income decreases are not evident

serviced in the building. Operating expenses are not significant during the year of the recession, but become increasingly significant one and two years after the recession begins. One year later operating expenses increase to 19.72% [exp(0.18)-1]and two years later they reach 44.1% [exp(0.36)-1]. Some of the reasons behind these continuous increases are: the additional Tenant Improvements (TI) costs the owners must incur to maintain/attract tenants as well as potential increased maintenance and utility costs due to vacancy. The results of column 4 (more than 600,000sf) are identical to those of column 3, with the only exception being the lag effect of the recession, which becomes evident 2 years after the recession. The increase of operating expenses is estimated at 26.61% [exp(0.236)-1].

Exhibit 4 – Column 5 (300,000sf-599,999sf) – results indicate that average taxes decrease with an increase in the unemployment rate, prime rate and avrg. sf/worker. The effect of unemployment on taxes is less expected because the focus of the study is in office properties which are taxed more easily compared to residential properties. Although the taxes seem to decrease by 10% when the unemployment rate increases, recessionary times are far different with taxes increasing by 13.8% during a recessionary year, 10.5% a year later and 12.7% two years later. The increase of avrg. sf/worker is associated with a 0.1% decrease in avrg. taxes, which is expected because office owners of these types of properties appeal their taxes based on vacancy levels and space inefficiencies. There are only two statistically significant results in column 6 (more than 600,000sf), which have an identical effect on taxes as the results presented in column 5. Column 6 is the only result column where the recession year has a statistically significant effect on taxes. Taxes seem to increase for office properties of this group by 12.7% during recession years.

Exhibit 4. Results of OLS Regression Models

Dependent Variable	Log (Average Rental Income/sf)		Log (Average Operating expenses/sf)		Log (Average Taxes/sf)	
	1	2	3	4	5	6
Independent Variables	300K-599K	>600K	300K-599K	>600K	300K-599K	>600K
Average Annual Unemployment rate	-0.0009 -0.08	0.01 1.05	-0.2 -2.79	-0.094 -2.67	-0.1 -4.3	-0.07 -1.58
Bank Prime rate	-0.008 -1.93	-0.004 -1			-0.02 -2.66	-0.01 -0.83
Commercial Mortgage debt	0.00007 2.94	0.00001 0.73	-0.0001 -1.45	-0.0001 -1.59	0.00004 0.62	-3E-05 -0.37
Average sf/worker	-0.001 -4.89	-0.0008 -4.74	-0.003 -3.56	-0.003 -4.83	-0.001 -2.97	-0.001 -2.39
Recession dummy	0.04 2.11	0.02 1.03	0.094 1.61	0.007 0.12	0.13 2.76	0.12 1.98
Recession dummy lag 1 year (+)	-0.009 -0.3	0.01 0.47	0.18 1.8	0.124 1.47	0.1 1.9	0.05 0.66
Recession dummy lag 2 years (+)	0.01 0.51	-0.025 -0.83	0.366 2.82	0.236 2.78	0.12 2.14	0.09 0.92
Average crude oil prices	-0.002 -3.27	-0.002 -4.71	0.004 1.29	0.002 1.26	-0.001 -0.78	-0.001 -0.66
Constant	3.613	3.69	4.39	4.06	2.48	2.58
Number of observations	46	45	45	45	45	45
R2	64.98%	70.70%	80.05%	80.78%	78.67%	46.17%

Yellow highlights statistical significance at 5% level
Green highlights statistical significance at 10% level
(+): Recession year is excluded

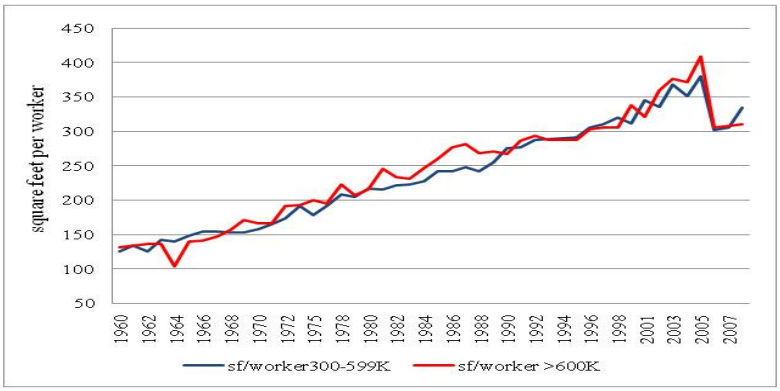


Exhibit 5. Trend of average square feet per worker in the two building groups

The study of cyclicality patterns among average rental income, operating expenses and taxes indicates the existence of cycles in all cases with high R squares (66% - 75%) (Exhibit 6). The periodicity of the larger buildings (more than 600,000sf) is slightly smaller (about 2 years difference) compared to those with less than 600K. The most significant difference between the two groups of buildings is seen in the income levels, where larger buildings are experiencing a smaller 17 year cycle in contrast to smaller buildings which have an almost 21 year cycle. The cycle difference between the two might be caused by the concentration of more tenants in larger buildings, which means more frequent tenant turnover. Keeping in mind that Wheaton (1987) and Barras (1983) have estimated office construction cycles to be on between 10 to 12 years, the results of this study indicate that it takes two construction cycles to experience changes in income, operating expenses and taxes. This finding can be expected, because downtown areas do not develop as easily as suburban locations due to limited lot availability and demolition costs (the Wheaton (1987) and Barras (1983) results were not only focused on downtowns). Another factor is lease time length, which averages about 15 years.

Exhibit 6. Cyclicality results

Variable	Building type	Equation	ω (years)$^{-1}$	Period T (years)	R^2
Average Rental Income/sf (ARI)	300K-599K	ARI=1.284*sin(sin(2*π*0.048*ti +3.311)	0.048	20.83	66.26%
	>600K	ARI=1.568*sin(sin(2*π*0.058*ti +2.540)	0.058	17.24	75.21%
Average Operating expenses/sf (AOE)	300K-599K	AOE=2.236*sin(sin(2*π*0.038*ti +3.428)	0.038	26.32	69.07%
	>600K	AOE=5329.80*exp(-0.003*ti)*sin(sin(2*π*0.042*ti +2.662)	0.042	23.81	66.91%
Average Taxes/sf (AT)	300K-599K	AT=0.699*sin(sin(2*π*0.043*ti +3.686)	0.043	23.26	74.46%
	>600K	AT=2.158*exp(-0.0003*ti)*sin(sin(2*π*0.047*ti +1.864)	0.047	21.28	66.06%

Exhibits 7 and 8 highlight the cyclical behavior of the average rental income/sf for the two groups of buildings with a projection until 2020. The results indicate slight differences in the oscillations between the two groups with the more profound differences expected from 2009. The

income levels of larger buildings (>600K) are expected to fall more sharply until 2011 (trough) compared to the other building group with a peak estimated in 2016 at much lower levels than seen in years before. In contrast, the other building group is estimated to reach a trough in 2013 and a peak in 2015. Comparing the two Exhibits and overlaying the recession periods it is clearly evident that the recessions of the 1970s affected income levels substantially and the recovery (with slight fluctuations) we enjoyed is over for until 2016 for the larger buildings (>600K). The projection estimation for the larger buildings indicates that those buildings are expected to face income levels similar to those in the 1970s.

Exhibit 7. Average Office Rentable Area Income (300K-599K)

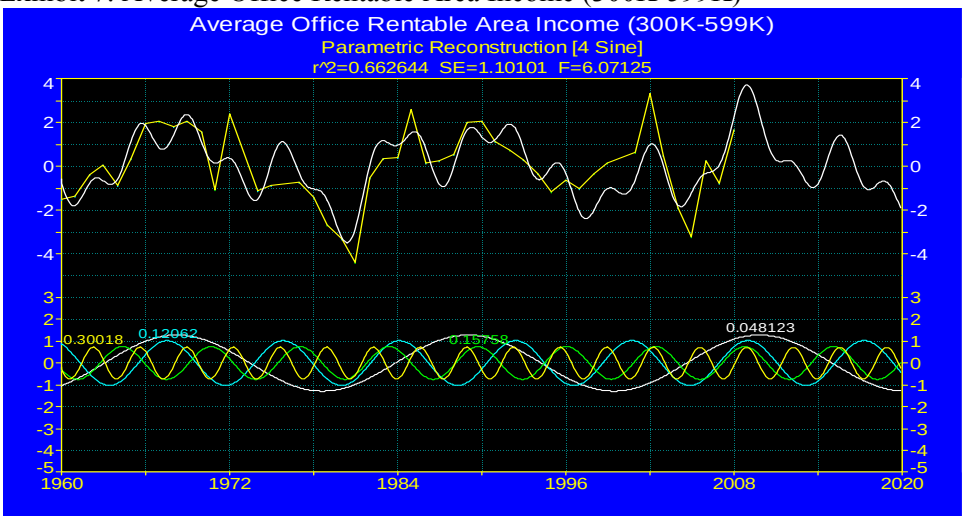
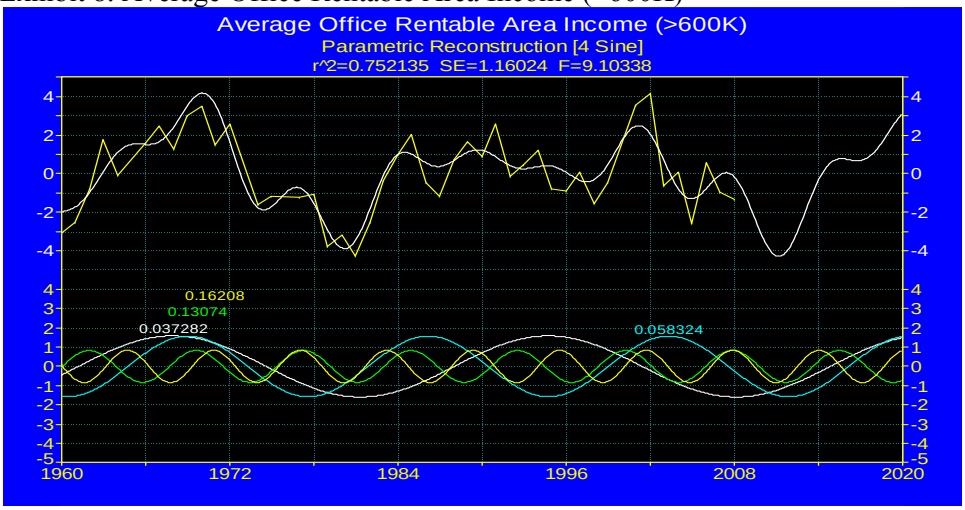


Exhibit 8. Average Office Rentable Area Income (>600K)



Exhibits 9 and 10 highlight the cyclical behavior of the average operating expenses/sf for the two groups of buildings with a projection until 2020. The results indicate slight differences in the oscillations between the two groups especially in the late 60s early 70s. Operating expenses

are expected to increase more sharply for smaller buildings after 2012. The next trough is expected that year with a peak estimated for 2016. For larger properties (>600K) the trough was in 2008 and operating expenses increased ever since with the next peak predicted for 2012. Comparing the two Exhibits and overlaying the recession periods, it is evident that the 70s energy crisis affected the two building groups with a slight shift; larger properties were affected with a slight delay compared to smaller properties. This is expected because larger properties have more complicated building systems and more tenants, which make changes in lease contracts more time consuming. The two building types seem to show similar reactions in the 1980s, with almost level expenses from 2008 to 2014 for the smaller properties, in contrast to larger properties where operating expenses started to increase since 2008.

Exhibit 9 . Average Office Rentable Area Operating Expenses (300K-599K)

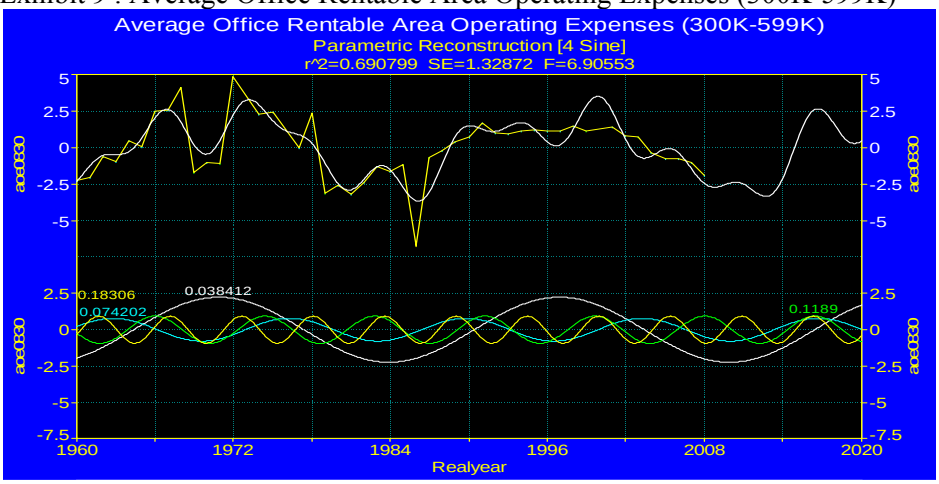
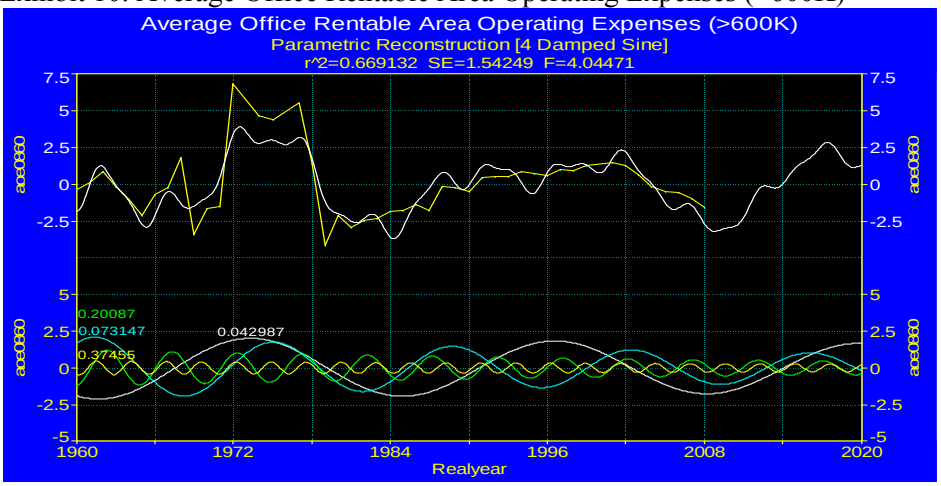


Exhibit 10. Average Office Rentable Area Operating Expenses (>600K)



Exhibits 11 and 12 highlight the cyclical behavior of the average taxes/sf for the two groups of buildings with a projection until 2020. The results indicate slight differences in the

oscillations between the two groups especially in the mid 80s period. The taxes in both building groups are expected to increase until 2015 for smaller buildings and 2014 for larger buildings. Taxes are expected to increase at the 1970s and early 1990s levels.

Exhibit 11. Average Office Rentable Area Taxes (300K-599K)

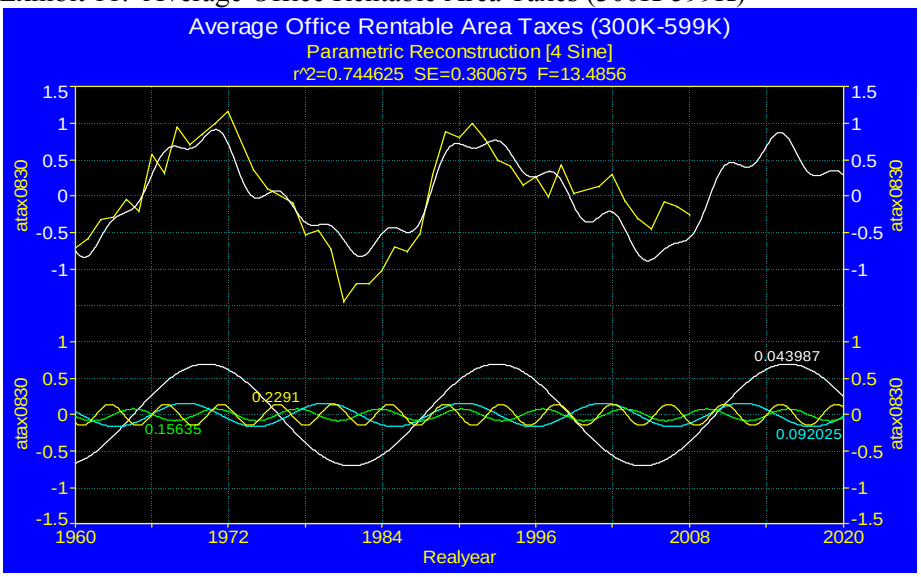
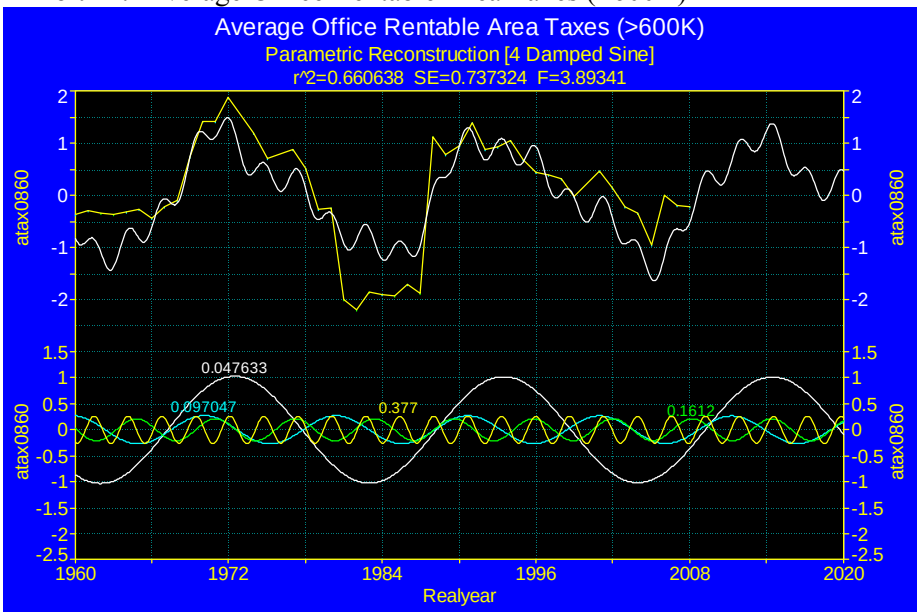


Exhibit 12. Average Office Rentable Area Taxes (>600K)



Conclusion

This study uses a unique dataset, which combines economic and office market data for a period spanning almost 50 years (from 1960 to 2008), in an effort to improve our understanding of downtown office market trends for two groups of buildings (300,000sf to 599,999sf and more than 600,000sf). The weighted regression modeling indicates that recessions affect operating

expenses, but with a one year lag for 300K-599K and 2 year lag for more than 600K buildings. Property taxes increase during recession years for both building groups, but continue to increase for the smaller group of buildings one and two years after the recession. Income levels for smaller buildings are only affected during a recession year. Increases in average crude oil prices have a negative effect on income of both building groups. The same is true for the average sf/worker which affects significantly income, expenses and taxes of both groups.

The application of Fourier analysis, to determine the existence of cyclicality patterns among average rental income, operating expenses and taxes, clearly indicates the existence of cycles with a period of about 19 years for income levels, 25 years for operating expenses and 22 years for taxes, while considering the two building groups. Income levels are expected to decrease until 2011 (small & large buildings) and peak in 2016 (large buildings). Operating expenses are expected to increase especially after 2012 for both building groups, although the increase started for the large buildings since 2008. Taxes are also expected to increase with a peak expected for small properties in 2015 and larger properties in 2014.

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