
Corporate location decision making in light of terrorism threaten city environments – The cases of New York and Chicago

Dr. Sofia V. Dermisi

Assistant Professor of Real Estate
Walter E. Heller College of Business Administration
Roosevelt University
430 South Michigan Avenue
Chicago IL 60605
USA
Phone: (312) 281-3355
Fax: (312) 281- 3290
Email: sdermisi@roosevelt.edu

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Abstract

For many years, corporate location decision-making has been based, among numerous factors, on proximity to transit sources, concentration of qualified employees, relationship with peer and other institutions. Downtowns of major cities have always offered significant benefits in all the aforementioned areas compared to remote locations, attracting corporations in significant numbers. After the terrorist attacks of September 11, 2001 in the U.S., corporations are highly concerned not only with their security at high-risk downtown locations but also with cost of redundant locations.

This paper examines the corporate relocation patterns of tenants of the World Trade Center complex after its collapse and the psychological shockwaves the terrorist attack spread to Chicago, a city with a major concentration of corporations and the site of the tallest office building in the U.S. The results of the study indicate a very limited disperse of corporate tenants of the former World Trade Center complex beyond Manhattan, a trend not followed by Chicago. The paper also highlights additional reasoning for the diverse effect of terrorism in an impacted city (New York) versus a city under threat (Chicago).

1. Introduction

The effects of terrorism attacks on an area's employment and the economy have been studied for many years, but the effect upon an area's office market has just begun, because of: a) the long term office market leases, which create a lag time after an event and b) the first time a private office building was targeted and fully collapsed in the US. Although there are a variety of academic papers on firm location models, the effects of the 9/11 events are challenging the rational behind them and additional modeling is required. Burns' (1974) study suggests that firms relocate their headquarters either vertically or horizontally. Firms relocating vertically (moves from central cities to suburbs) were attracted to lower rents and taxes, versus those relocating horizontally (moves between central cities) who were influenced by access to consultants, laboratories, capital sources and cultural facilities. Bartik (1985) found that the coefficients of the effective corporate income tax rate, wage rate and unionization variables have a significant negative effect on the probability of a branch location. Among other significant cost consideration were local taxes and business climate. Schemenner et al. (1987) found that taxes are not significantly related to the location of Fortune 500 company plants. More recently, Hughes & Nelson (2002) suggest that the old prominent model of an urban corporate campus (where advanced and complex functions benefit by being located in close proximity to each other), adopted in New York in the 1990s, will be replaced by a regional decentralized framework (all business continuity levels will be dispersed and not only the back office functions). Each site will be functioning on a different power and communication grid allowing business continuity in case of a major disaster. Evidence of this strategy is found in Morgan Stanley's relocation to Harrison NY (Bagli, 2002); and Goldman Sacks' personnel reduction in Lower Manhattan, since the 1990s [Wells & Burgess (2002), Bears Stearns (1998), JP Morgan (1996 & 2001) and Pohl (2004)]. The key element stressed by Hughes & Nelson (2002), however, is the cost associated with such a strategy and a company's financial constraints. The security costs in downtown Manhattan buildings rose from \$0.50/sf before 9/11 to more than \$1/sf in 2003 and the insurance costs increased from \$0.24/sf to \$0.40/sf, based on Kinum (2005). Kinum (2005) also notices that a move of just 15 to 20 miles outside the city can reduce the cost of security by as much as 60%. Johnson & Kasarda (2003) highlight that a number of commercial real estate brokers and corporate relocation consultants report an increasing number of their clients expressing a heightened aversion on locating at trophy properties and in close proximity to them, as well as near other large gathering venues (stadiums, arenas, major retail establishments), energy generating facilities, and infrastructure projects (bridges, tunnels, natural gas pipelines, water and sewer plants).

The goal of this paper is to review the relocation patterns of the World Trade Center tenants affected by the 9/11 attacks in New York and to determine the similarities or differences with the tenant reactions of “trophy” buildings and their immediate area in Chicago.

2. Methodology & Data

This paper is the first step in the study of the location patterns of tenants affected by the 9/11 attacks in New York and the tenant reaction pattern in a major U.S. city with multiple “trophy” buildings under the threat of an attack. The city of Chicago is selected not only because of the multiple “trophy” buildings, but also as home of the tallest building in the U.S. In the case of New York a cross reference among various reports and company website information was used to determine the most recent relocation patterns of the World Trade Center tenants. The paper presents both the before and after 9/11 tenants’ location and in the majority of cases includes the square feet currently occupied.

In the case of Chicago, the paper focuses on tenant reactions among three “trophy” buildings, their “shadow” (immediate surrounding) areas and areas in close proximity. The three buildings include: Sears Tower (110 floors), Aon Center (82 floors) and Hancock Center (100 floors – with some residential component). The study area surrounding these three buildings was defined based on:

- a. *World Trade Center debris field*: Considering the major debris field of the WTC, which ranged from more than 1,000 ft to 0.5 miles (RMS, 2001), a first radius of 0.2 miles was selected as “shadow” area (Figure 1). Considering the relocation patterns of New York 9/11 affected tenants, which ranged from 1-5 miles (for relocation within Manhattan), and the office market in Chicago a 2 mile radius was defined as the secondary area of study (Figures 2 - 4).
- b. *Class A¹ office space*: Another criterion for the selection of the participating buildings was a building’s classification, allowing the comparison of buildings offering similar amenities.
- c. *Year built*: All the properties selected were completed before 1998, providing a reference record for comparison.

¹ *Class A*: These buildings are extremely desirable investment-grade properties with the highest rents or sale prices compared to other buildings in the same market. They are well located and provide efficient tenant layouts, high quality, and in some buildings, one-of-a-kind floor plans. They can be an architectural or historical landmark designed by prominent architects. They contain a modern mechanical system and have above average maintenance and management as well as the best quality materials and workmanship in their trim and interior fittings (source: Costargroup).

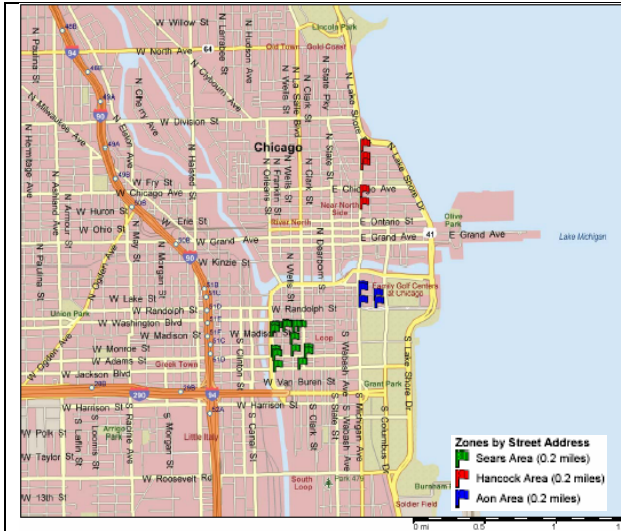


Figure 1. 0.2 mile radius (“Shadow” area)

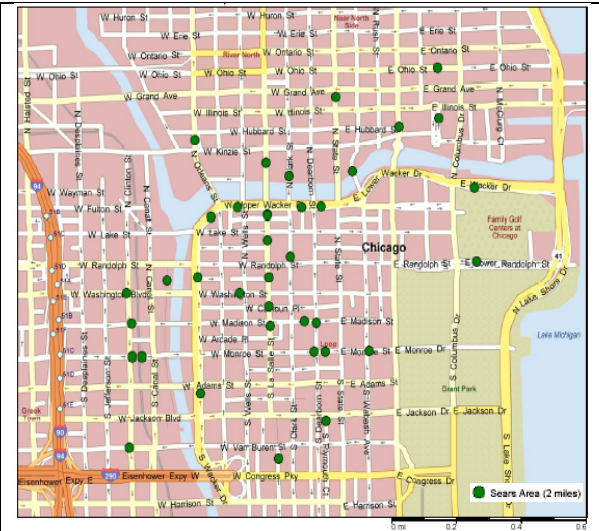


Figure 2. Sears area of study (2 mile radius)

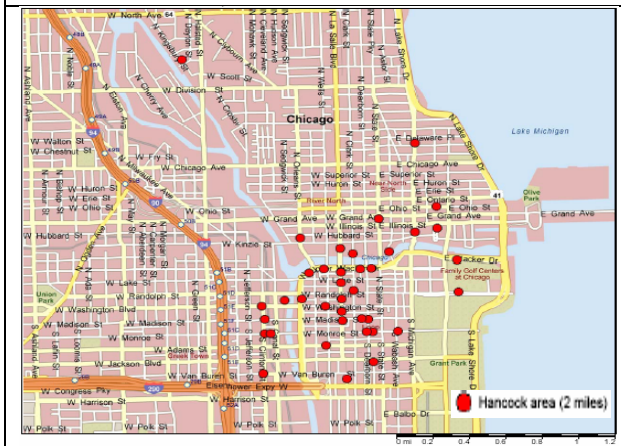


Figure 3. Hancock area of study (2 mile radius)

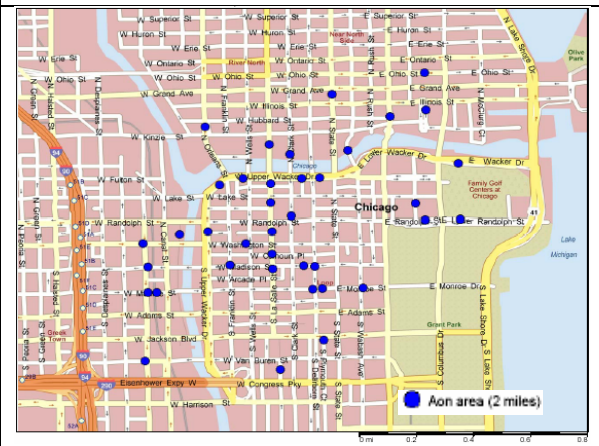


Figure 4. Aon area of study (2 mile radius)

In the case of Chicago, because of the absence of displaced tenants in immediate need of office space as in New York, the focus shifts to the total and sublease vacancy rate and gross rent levels of the buildings within the two radiuses, using Costargroup data. The before and after effect of the events of September 11 in Chicago are determined with the formation of two equal data groups of observations: (a) the before group (beginning from the third quarter of 1998 to the third quarter of 2001) and (b) the after group (beginning from the fourth quarter of 2001 until the fourth quarter of 2004).

3. New York case

3.1. *New York office market*

Although the vacancy rates across New York were relatively low before 9/11, the 2001 economic slowdown and the continuous job cut effects of the dot com crash were still visible. The second quarter of 2001 (the last before 9/11), the vacancy levels in the NY regions were the lowest in the Western part of Midtown (7.2%), followed by the Downtown (7.6%), the core Midtown (8%), the Southern Midtown with more than 10.7% and Urban New Jersey with 12%. Rents were the lowest in NJ (\$20/sf), followed by the Penn Station (below \$40/sf), Southern Midtown - Downtown (\$40/sf) and Midtown Manhattan (more than \$60/sf) (Pohl, 2004). After 9/11, vacancy rates went up to 12% Downtown and citywide vacancies increased from 7.6% to 11.6%. Vacancy of downtown A space rose from 3.7% to 14.5% and rents fell by 13% (Beard 2002, Colliers 2003). Kelly (2002), however, argues that even with a regional vacancy of more than 10% and an overall Manhattan vacancy at 8.7% there was a volume of unused office space almost equivalent to three World Trade Centers (WTC) in Manhattan alone, and nearly five WTC in the region.

3.2. *World Trade Center site and physical impact of attack*

The World Trade Center (WTC) site comprised of 16 acres with seven buildings grouped around a 5-acre plaza (Figure 5) (FEMA, 2002) and hosted more than 430 companies from 28 countries (Pohl, 2004). Although the terrorists' targeted two buildings within the complex (WTC 1 and WTC 2), three buildings eventually fully collapsed the same day (WTC 1, WTC 2 and WTC 7) and numerous surrounding buildings suffered various types of damages (Figure 6). Adjacent structures were damaged by both debris from the collapsing towers as well as from the density and pressure of the dust clouds generated by the collapse of WTC 1 and WTC 2 (FEMA, 2002).

The destruction of WTC complex buildings impacted significantly the downtown class A office space, due to the height and classification of the properties destroyed. The amount of class A office space totally destroyed in the WTC attack is estimated at 13 million and another 17 million was damaged in various degrees (Table 1). Both the destroyed and damaged office space represent 11% of the Manhattan class A space and 44% of the downtown class A space (The City of NY, 2001). In relation to the total Manhattan office space, however, the total destroyed space represents only 3% and adding the damaged space the percentage reaches 6-7% (The City of NY, 2001).

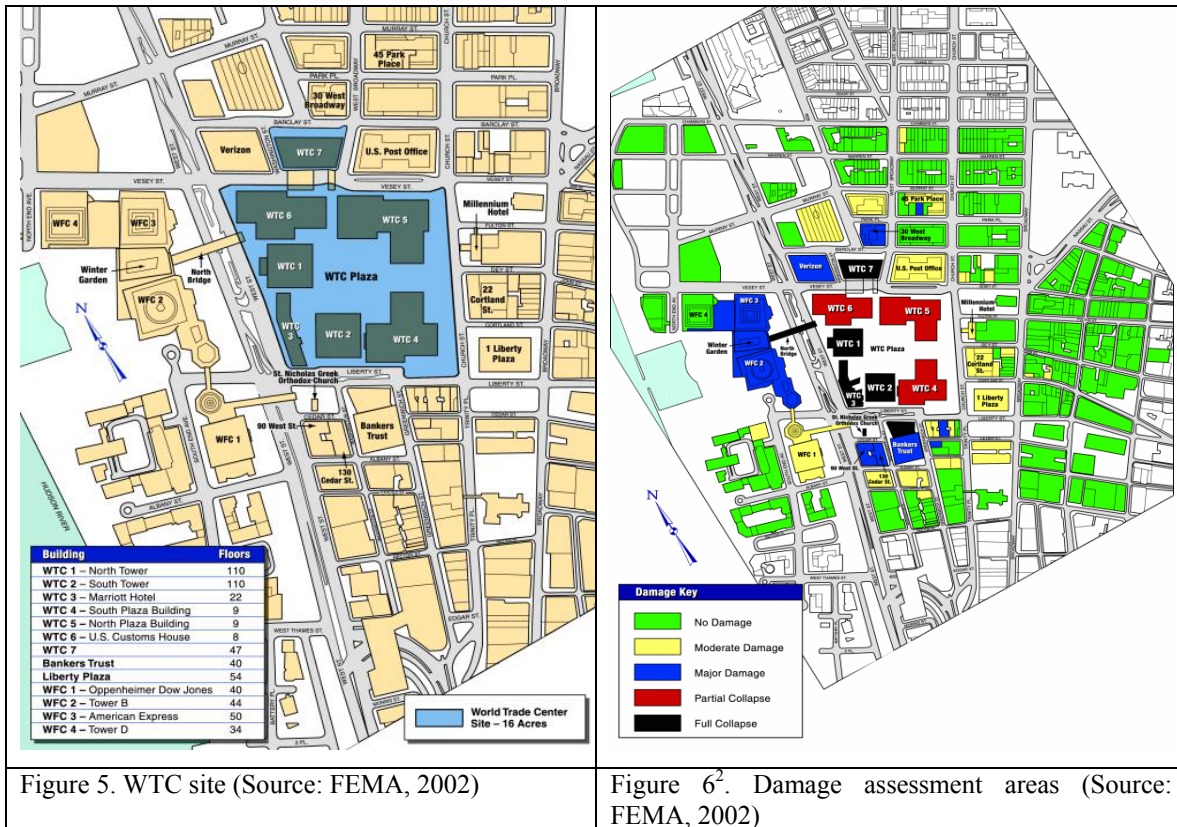


Figure 5. WTC site (Source: FEMA, 2002)

Figure 6². Damage assessment areas (Source: FEMA, 2002)

A study by Kelly (2002) found that smaller companies were more likely to make faster and more permanent relocation decisions in order to re-establish themselves quickly in the market. Larger firms on the other hand tended to split operations for redundancy purposes or because contiguous units of 250,000 square feet or more were difficult to find in the short-run. Larger firms also tended to take short-term leases until the reopening of their damaged buildings. Three-quarters of the space impacted by the attacks was accounted for by 205 firms, each occupying 10,000 sf or more (Kelly, 2002). These 205 firms relocated to 279 facilities after 9/11, among which 207 facilities were occupied by firms with more than 20,000sf at the WTC area (140 facilities were permanent and 67 temporary). The relocation preferences of these 205 firms, suggests that companies were not as sensitive to price rather than transportation access and the quality of office stock.

² Green: No significant damage found, Yellow: Broken glass, facade damage, roof debris, Blue: Damage to structural members requiring shoring or significant danger to occupants from glass, debris, etc, Red: Building is standing, but a significant portion is collapsed. All of these buildings were inspected and found to have no remaining certifiable structural capacity. Black: Building is not standing.

TenantWise's research (2003) reports that only 52% of the affected square feet area downtown was reoccupied by tenants. The tenant profile of those occupying the downtown area included 40% previously displaced tenants, 36% new long term leases, 23% backfilled into other unaffected space that was unoccupied or made available within a tenant's existing real estate portfolio and 1% tenants who have not yet made their relocation plans.

Table 1. Inventory of Destroyed and Damaged office buildings in lower Manhattan

Destroyed buildings	Square footage	Employment
WTC 1	4,761,416	19,175
WTC 2	4,761,416	14,997
WTC 4	576,000	1,861
WTC 5	783,520	3,639
WTC 6	537,693	1,913
WTC 7	2,000,000	5,245
Total Destroyed	13,420,045	46,830
Damaged buildings	Square footage	Employment
WFC 1	1,461,365	5,322
WFC 2	2,591,244	6,587
WFC 3	2,300,000	10,451
WFC 4	2,083,555	4,582
130 Cedar street	135,000	485
90 Church street	950,000	3,512
22 Cortland street	668,110	3,037
24-26 Cortland street	380,052	950
106 Liberty street	18,000	64
110 Liberty street	6,000	21
114 Liberty street	69,000	246
1 Liberty Plaza	2,124,447	6,072
90 West street	350,000	1,220
140 West street	1,171,540	1,741
30 West Broadway	381,000	221
1 Bankers Trust Plaza	1,415,000	
195 Broadway street	875,000	
Total Damaged	16,979,313	44,511
Total Destroyed & Damaged	30,399,358	91,341

Source: New York Metropolitan Transportation Council - Urbanomics & NYC controller's office

Table 2. Relocation areas of firms impacted by 9/11 (firms with more than 20,000 sf)

New Facilities location	Number of firms	%	New Facilities location	Number of firms	%
Downtown	60	28.99%	Suburban New Jersey	9	4.35%
Midtown core	46	22.22%	Soho to 14 th street	7	3.38%
Urban New Jersey	26	12.56%	Midtown South	7	3.38%
Midtown west	18	8.70%	Other	7	3.38%
Penn station	14	6.76%	Long Island	3	1.45%
North Suburbs	10	4.83%			

Source: Kelly (2002)

3.3 New York results

The cross-reference among government reports and firm websites enhance and reaffirms the initial relocation patterns towards Midtown Manhattan, especially for World Trade Center tenants who occupied more than 20,000 sf (Figure 7). Although a number of buildings were impacted by the attacks of 9/11 the tenants with a more permanent need of operational office space were those in the World Trade Center buildings. The unique needs of each firm, the market availability and a firm's redundancy plans dictated in many cases the need of more than one site after 9/11. However, Table 3 highlights a firm's location before and after 9/11, with reference to the specific street address only within Manhattan. In an effort to compare the before and after 9/11 effects, Table 4 presents the relocation patterns of firms selecting only one relocation site. Among the five World Trade Center buildings studied, tenants of WTC 1, 2 and WTC 7 seem to have the strongest preference for Midtown versus other locations. In addition, WTC 1 tenants were more reluctant to relocate downtown compared to WTC 2 tenants, which needs further analysis on a firm by firm basis, because of the similar nature of business activities but the different relocation patterns. Although WTC 4 and 5 tenants seem to have a higher preference for Downtown, this result is partially biased, because of the limited number of firms with 20,000 sf or more and the presence of government or other institutions in need to be downtown.

The comparison of occupied square feet of all World Trade Center buildings and their tenants before and after 9/11 reveals one exception, the WTC 2 tenants who expanded their square footage and their spatial distribution. The vast majority of square footage expansion is located at Midtown further enhancing its importance compared to the other areas. More interestingly, although fewer companies from WTC 2 are located only in Midtown compared to WTC 1 they occupy larger space.

Table 3

Table 4. Distribution of after 9/11 location (only one relocation site)

	number of tenants	Midtown (all)	Downtown	NJ
WTC 1	20	81.82%	4.55%	13.64%
WTC 2	31	76.00%	24.00%	0.00%
WTC 4	2	0.00%	100.00%	0.00%
WTC 5	4	33.33%	66.67%	0.00%
WTC 7	9	66.67%	33.33%	0.00%

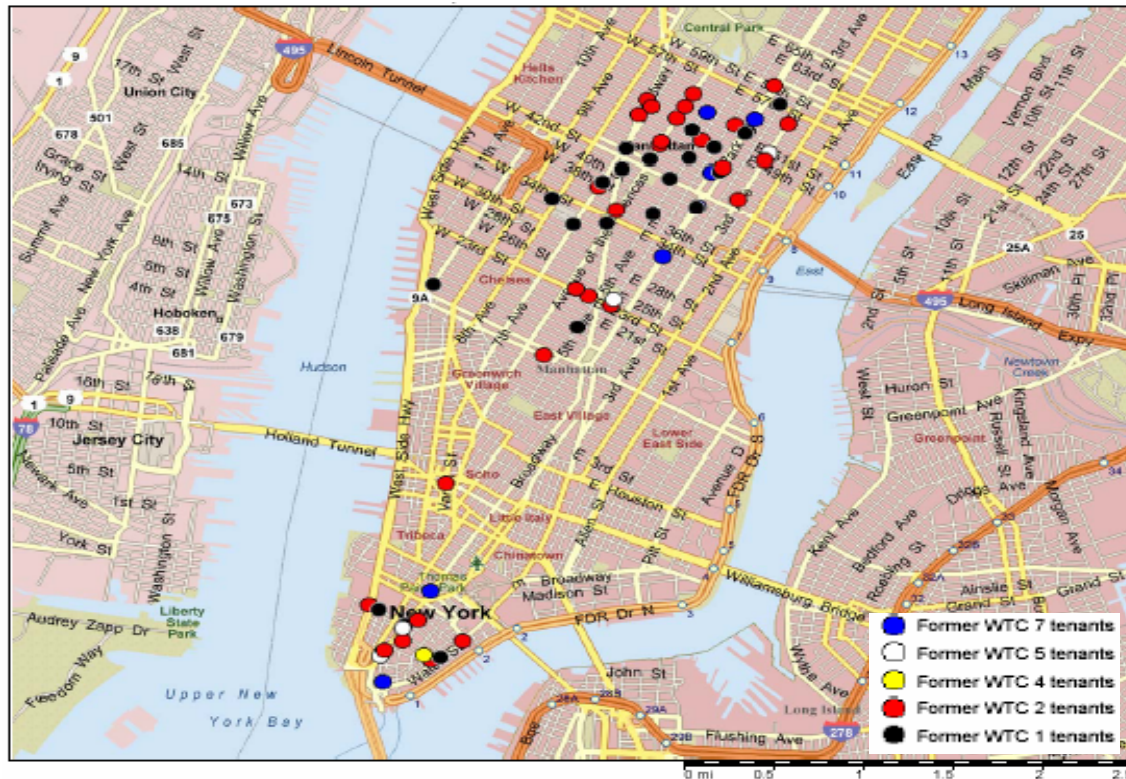


Figure 7. Updated relocation pattern of WTC tenants

Table 5. Comparison of WTC tenant square footage use before and after 9/11

	number of tenants	Square footage before 9/11	Square footage after 9/11	Percentage Difference
WTC 1	20	2,787,122	2,737,679	-1.77%
WTC 2	31	3,441,159	3,906,191	13.51%
WTC 4	2	398,991	288,991	-27.57%
WTC 5	4	574,444	469,952	-18.19%
WTC 7	9	1,847,395	1,245,243	-32.59%

This updated study of the tenant relocation patterns of the World Trade Center tenants reaffirms the continuous draw the Midtown Manhattan area poses over other neighboring areas regardless of firm repelling factors highlighted by Pohl (2004), such as risk averseness, rising insurance premiums, industry consolidation and direct spending on security. On the other hand

Hughes & Nelson (2002) and Pohl (2004) site some factors as key in the prevention of a massive suburban shift and economic de-concentration for the following reasons:

- a) Although the “ready-to-go” replacement space was quickly consumed, firms not forced to make decisions postponed them allowing them time to understand the economic conditions and in the majority of cases decided to maintain their locations.
- b) Skilled labor, modern office space, and extensive tax incentives were offered to firms relocating in New York City.
- c) Direct replacement space needs were significantly reduced below the level of that rendered unavailable by the attacks, due to large corporate layoffs, use of telecommuting, hoteling and previously established business-continuity sites.

4. Chicago results

The comparison of before and after 9/11 trends for trophy buildings, their “shadow” areas and buildings in a 2 mile radius (Figures 2-4) indicate the significant suffering of the “shadow” areas of the three “trophy” buildings versus buildings in the 2 mile radius. Table 6 highlights the differences in average vacancy rates (total and sublease) and gross asking rents before and after 9/11 for the two radiuses. Although average vacancy rates present a significant increase compared to asking rents, further statistical analysis provides a more accurate insight on the market conditions. Table 7 highlights the absence of significant statistical difference in sublease vacancy for buildings at the 2 mile radius in contrast to the 0.2 mile radius, when comparing before and after 9/11 values at the 5% confidence level. Combining this anemic sublease activity with the significant difference of total vacancy is a clear indication of tenant exodus at the lease expiration date and lack of significant lease renewal activity. Although after 9/11 owners kept their rents at similar levels as before this action was not sufficient to alleviate the risk felt by tenants, especially in the “shadow” areas. In the case of Chicago, the owners and managers were left without any additional aid by the city or federal government (e.g. tax incentives etc.) in their effort to maintain and attract tenants at “trophy” buildings and their “shadow” areas not allowing the rapid market stabilization.

Table 6. Average Vacancy (Total & Sublease) and Average Gross Asking Rents before and after 9/11

	Total Vacancy					
	Aon area		Hancock area		Sears area	
	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius
Before 9/11	15.85%	10.25%	13.09%	10.09%	10.46%	10.26%
After 9/11	20.28%	15.43%	17.57%	15.34%	17.53%	15.49%
Difference	27.96%	50.56%	34.26%	51.98%	67.57%	50.94%
	Sublease Vacancy					
	Aon area		Hancock area		Sears area	
	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius
Before 9/11	3.08%	2.04%	1.78%	2.02%	2.30%	1.93%
After 9/11	4.90%	3.08%	2.70%	3.13%	3.71%	3.07%
Difference	59.35%	50.96%	51.66%	54.58%	61.53%	58.75%
	Gross Asking Rents					
	Aon area		Hancock area		Sears area	
	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius	0.2 mile radius	2 mile radius
Before 9/11	28.77	29.53	28.76	29.31	32.63	29.58
After 9/11	29.83	30.15	30.24	29.74	31.99	29.77
Difference	3.69%	2.08%	5.13%	1.50%	-1.97%	0.63%

Before 9/11: (3rd quarter of 1998 - 3rd quarter of 2001), After 9/11: (4th quarter of 2001 - 4th quarter 2004)

Table 7. T-test of average vacancy (total, sublease), rents and square feet leased before and after 9/11

Areas		Avg. Vacancy rate	Avg. Sublease vacancy rate	Avg. Gross Rents
Aon area	0.2 mile radius	t(13)= -3.26	t(13)= -1.98	t(13)= -1.46
	2 mile radius	t(13)= -6.38	t(13)= -1.23	t(13)= -1.12
Hancock area	0.2 mile radius	t(13)= -9.01	t(13)= -4.38	t(13)= -3.59
	2 mile radius	t(13)= -7.20	t(13)= -1.49	t(13)= -0.81
Sears area	0.2 mile radius	t(13)= -7.27	t(13)= -2.41	t(13)= 1.26
	2 mile radius	t(13)= -5.90	t(13)= -1.49	t(13)= -0.30

5. Conclusions

The results of this study indicate that the majority of World Trade Center (WTC) tenants preferred to locate in the Midtown area of Manhattan, considering it safer than downtown regardless of fears of other attacks and rising insurance and security costs. WTC 2 tenants were spatially more diversified in their relocation decisions and occupied larger areas compared to the WTC 1 tenants, especially downtown. In the case of Chicago a decrease of attractiveness of “trophy” buildings and their “shadow” areas is observed, but buildings of similar class in a safer distance are performing better.

The comparison of the effects of an attacked city (New York) versus a city under threat (Chicago) highlights the effectiveness of the measures taken in New York by the city and Federal government in maintaining a significant number of affected firms in Manhattan, within an area no more than 5 miles from Ground Zero. The lack of similar measures in the case of Chicago has led to the continuation of the suffering of “trophy” buildings and their “shadow” areas until today.

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