Third Quarter 2018 Nancy Packes, Inc TriBoro Rental Report

Highlights

This report uses an analysis based on five years of achieved rents in Manhattan, Brooklyn and Queens correlated to supply of new units to predict future rent growth. The correlation is highly accurate in reproducing achieved rents and, therefore we believe, also accurate in projecting rents through 2022, the latest year when new rental unit supply can be forecast with some precision.

Also based on the last five years of rent growth by unit type, it tracks the evolution of Brooklyn from a value choice to a lifestyle destination.

It seeks to define functionally core versus non-core neighborhoods in Brooklyn by demonstrating that rents in non-core neighborhoods are more dependent on building size than in core neighborhoods because, in core neighborhoods, location is a much more heavily weighted factor than building size.

It also considers how the expansion of development in the outer boroughs will affect building mixes and pricing.

Supply

While news of the rental market has been dominated by the recent 50 year high in supply; that issue is almost in the rear view mirror. It has always masked larger questions of the shift in demand from Manhattan to the outer boroughs and the effect on rental pricing of the expansion of development in the outer boroughs themselves from core to non-core neighborhoods.

In saying that the supply issue is almost history, it will be helpful to review the supply chart on the following page taken from the Nancy Packes Data Services Pipeline Database. Please note, for purposes of analysis, we have defined core and non-core neighborhoods in Brooklyn and Queens as discussed below.

In characterizing recent supply as exceptional, we should recap how we came to this 50 year high in new housing units in both the rental and sale markets in New York City. After the Lehman crisis, there was a global response to the economic downturn that centered on increasing the money supply with the concomitant result that interest rates plummeted and are still near record lows. With record low interest rates institutions like pension funds that depend on constant high bond yields could no longer look to financial instruments to satisfy their funding needs. Also, other institutional investors veered

away from financial markets because of their volatility and directed their investment perspectives toward hard assets such as commodities and real estate.

Low interest rates and the desire for safe havens for capital propelled values in the "for-sale" housing market much higher. At the same time, stagnant wage growth made that pricing unattainable for a larger proportion of the population, thus creating the demand for more rental housing.

Coincidentally, just before Lehman in 2006, the expansion of rental housing into Brooklyn had begun. After Lehman, with the focus in Manhattan on "for-sale" housing, rental housing found its outlet in Brooklyn and Queens, where land was more readily available at lower prices.

The second factor was the then imminent demise of the 421 a subsidized housing tax incentive that motivated many developers to begin projects to secure those benefits.

So, global financial policy and a local law combined to create the conditions for the greatest increase in the supply of new housing units New York City has seen in 50 years. Conditions today are different and the drop off in new supply can clearly be seen in the chart below from our Pipeline Database. The supply of new housing units to the 3 boroughs of Manhattan Brooklyn and Queens will diminish greatly after 2019 in Manhattan and Brooklyn and after 2020 in Queens as well.

Market Rate Rental Units Pipeline												
	Years											PIPELINE TOTALS
	2013	2014	2015	2016	2017	2018	2019	2020	2021	Later	Unkn.	Units
Manhattan Core	2,435	1,487	2,973	4,746	3,368	4,086	2,305	1,403	1,012	0	300	24,115
Manhattan Non-Core	102	365	91	580	366	598	827	188	0	365	0	3,482
Brooklyn Core	1,607	1,905	2,877	1,310	3,066	2,557	1,510	929	77	1,008	264	17,110
Brooklyn Non-Core	785	1,079	501	2,034	4,659	3,426	2,705	1,738	147	0	0	17,074
Queens Core	2,282	1,251	476	1,273	3,531	3,826	2,283	3,427	2,400	0	1,537	22,286
Queens Non-Core	396	291	582	293	62	701	632	925	27	406	273	4,588
TOTAL	7,607	6,378	7,500	10,236	15,052	15,194	10,262	8,610	3,663	1,779	2,374	88,655

For the chart above, and our analysis later of the definition of core and non-core neighborhoods, Manhattan Core was defined as below 110th Street on West Side and below 96th Street on East Side. Brooklyn Core was defined as Williamsburg, Dumbo, Brooklyn Heights, Vinegar Hill, Downtown Brooklyn and Fort Greene. Brooklyn Non-Core was defined as the group of neighborhoods that had more than 200 new rental units delivered since 2012: Bushwick, Green Point, Bedford – Stuyvesant, Gowanus, Stuyvesant Heights, Crown Heights, Clinton Hill, Prospect Lefferts Gardens, Prospect Heights, Prospect Park South, Flatbush, Park Slope, Boerum Hill, Cobble Hill, Carroll Gardens, Columbia St. Waterfront District and Ocean Hill. Queens Core was defined as Long Island City, including Hunters Point. Queens Non-Core was defined as the group of neighborhoods that had more than 100 new rental units delivered since 2012: Astoria, Briarwood, Elmhurst, Jamaica, Kew Gardens and Rego Park.

Nancy Packes Data Services Pipeline Database
New Market Rate Rental Units By Year By Borough
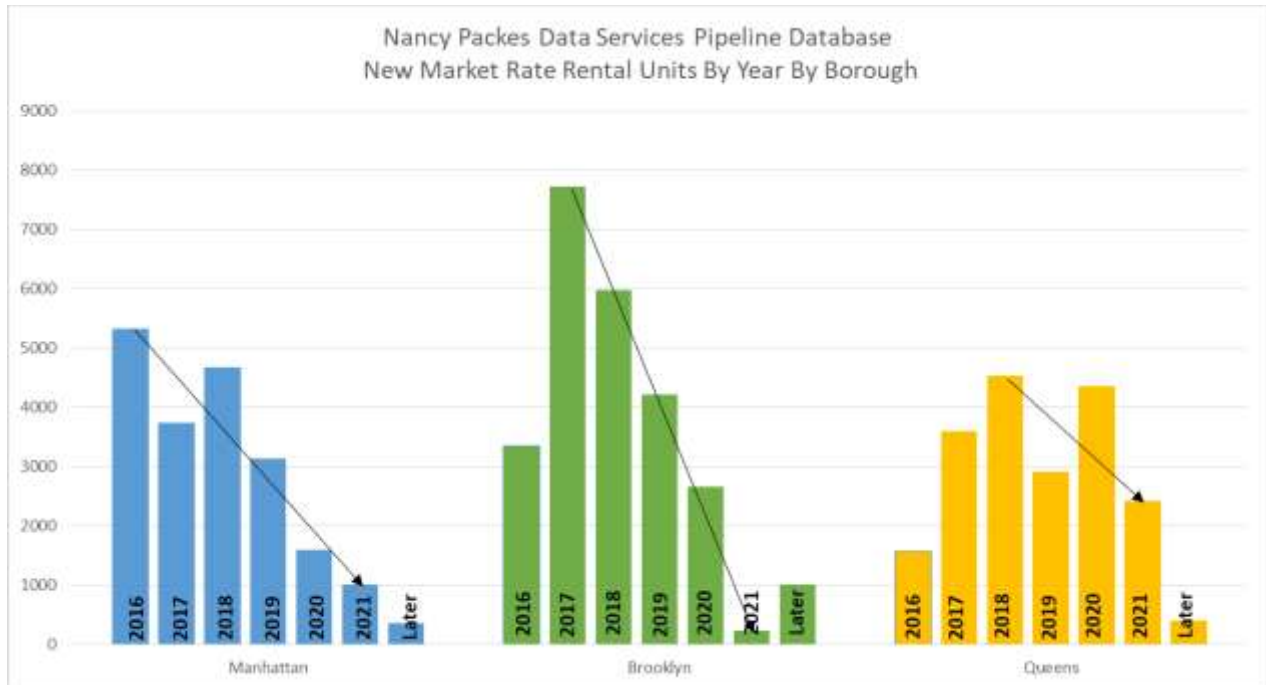
As the chart above illustrates, the drop off in supply for Manhattan will start in 2019, for Brooklyn the drop started in 2018 and for Queens the drop off will start after 2020.

It is also important to know how much of this supply has been absorbed. A look at gross rents each year in Manhattan and the outer boroughs clearly indicates that the supply is being absorbed as it comes to market. If that were not the case then, like a snowball rolling downhill, the supply would increase and eventually show its impact in a continuing decline in gross rents. It may be argued that increased concessions were used to stabilize and grow gross rents. That's true. The lower net rents also sped absorption so that, on average, during the years of the supply glut, gross rents kept rising. This is illustrated in the chart below of gross rents by unit type. This chart is from the Nancy Packes Data Services Transactions Database which also contains net rents, not relevant to this analysis of absorption. Later on in this report we will use another approach to show that supply has been absorbed as it came to market.

Manhattan Attended Rental Values																		
Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change[1]	Annual Change[2]
Studio	2,348	2,555	9%	2,690	5%	2,812	5%	2,743	-2%	2,955	8%	3,009	2%	3,000	0%	3,063	2%	30%	3%
1 BR	3,279	3,455	5%	3,628	5%	3,721	3%	3,763	1%	3,970	5%	4,031	2%	4,065	1%	4,147	2%	26%	3%
2 BR	5,331	5,721	7%	5,875	3%	6,036	3%	6,314	5%	6,258	-1%	6,297	1%	6,305	0%	6,441	2%	21%	2%
Overall	**3,482**	**3,702**	**6%**	**3,850**	**4%**	**3,970**	**3%**	**4,032**	**2%**	**4,205**	**4%**	**4,267**	**1%**	**4,265**	**0%**	**4,360**	**2%**	**25%**	**3%**
Non-Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change	Annual Change
Studio	1,496	1,646	10%	1,665	1%	1,700	2%	1,916	13%	1,759	-8%	1,911	9%	1,958	2%	1,900	-3%	27%	3%
1 BR	1,734	1,936	12%	2,075	7%	2,113	2%	2,236	6%	2,202	-2%	2,316	5%	2,271	-2%	2,318	2%	34%	4%
2 BR	2,552	2,820	10%	2,775	-2%	3,183	15%	3,069	-4%	3,171	3%	3,138	-1%	3,032	-3%	3,060	1%	20%	2%
Overall	**1,954**	**2,241**	**15%**	**2,266**	**1%**	**2,433**	**7%**	**2,478**	**2%**	**2,408**	**-3%**	**2,479**	**3%**	**2,428**	**-2%**	**2,478**	**2%**	**27%**	**3%**

Brooklyn Attended Rental Values																		
Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change	Annual Change
Studio	1,780	2,187	23%	2,553	17%	2,420	-5%	2,504	3%	2,591	3%	2,719	5%	2,724	0%	2,741	1%	54%	6%
1 BR	2,605	2,868	10%	3,106	8%	3,105	0%	3,320	7%	3,387	2%	3,405	1%	3,504	3%	3,504	0%	35%	4%
2 BR	3,670	4,475	22%	4,747	6%	4,822	2%	4,945	3%	4,925	0%	4,664	-5%	5,064	9%	5,095	1%	39%	4%
Overall	**2,833**	**3,170**	**12%**	**3,571**	**13%**	**3,353**	**-6%**	**3,540**	**6%**	**3,636**	**3%**	**3,556**	**-2%**	**3,683**	**4%**	**3,630**	**-1%**	**28%**	**3%**
Non-Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change	Annual Change
Studio	1,857	1,881	1%	1,754	-7%	1,789	2%	2,149	20%	2,210	3%	2,345	6%	2,322	-1%	2,353	1%	27%	3%
1 BR	2,172	2,421	11%	2,245	-7%	2,432	8%	2,642	9%	2,688	2%	2,886	7%	2,905	1%	2,874	-1%	32%	4%
2 BR	3,034	3,665	21%	2,982	-19%	3,262	9%	3,615	11%	3,651	1%	3,640	0%	3,982	9%	3,584	-10%	18%	2%
Overall	**2,547**	**2,813**	**10%**	**2,510**	**-11%**	**2,702**	**8%**	**2,882**	**7%**	**3,027**	**5%**	**3,041**	**0%**	**3,152**	**4%**	**2,992**	**-5%**	**17%**	**2%**

Queens Attended Rental Values																		
Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change	Annual Change
Studio	2,345	2,449	4%	2,326	-5%	2,354	1%	2,068	-12%	2,119	2%	2,310	9%	2,259	-2%	2,378	5%	1%	0%
1 BR	2,852	3,038	7%	3,008	-1%	2,849	-5%	2,750	-3%	3,269	19%	3,236	-1%	3,311	2%	3,299	0%	16%	2%
2 BR	3,349	4,090	22%	3,836	-6%	3,764	-2%	3,850	2%	3,499	-9%	4,042	16%	4,001	-1%	4,087	2%	22%	3%
Overall	**2,827**	**3,096**	**10%**	**3,018**	**-3%**	**2,994**	**-1%**	**2,781**	**-7%**	**3,534**	**27%**	**3,368**	**-5%**	**3,402**	**1%**	**3,367**	**-1%**	**19%**	**2%**
Non-Core	2010	2011	Δ Change	2012	Δ Change	2013	Δ Change	2014	Δ Change	2015	Δ Change	2016	Δ Change	2017	Δ Change	2018	Δ Change	% Change	Annual Change
Studio	921	1,500	63%	1,250	-17%	1,321	6%	1,578	19%	1,554	-1%	1,581	2%	1,672	6%	1,737	4%	89%	8%
1 BR	2,183	2,634	21%	3,035	15%	3,532	16%	3,527	0%	2,777	-21%	2,837	2%	2,850	0%	2,890	1%	32%	4%
2 BR	2,269	2,100	-7%	2,000	-5%	2,686	34%	2,644	-2%	2,525	-5%	2,447	-3%	2,405	-2%	2,716	11%	20%	2%
Overall	**1,413**	**1,624**	**15%**	**1,641**	**1%**	**2,225**	**36%**	**2,195**	**-1%**	**2,036**	**-7%**	**2,100**	**3%**	**2,233**	**6%**	**2,253**	**1%**	**59%**	**6%**

1. Percent change is total percent change calculated by the difference in rents from 2010 to 2018.
2. Annual change is compound annual growth rate (CAGR) calculated by the difference in rents from 2010 to 2018.
*Source: Nancy Packes Data Services Transactions Database.

In all three boroughs, the total change in rent over the past almost eight years is substantially positive. So, a build-up in supply cannot be weighing on the market. It is interesting to note that, over the twenty years before Lehman, rent growth in Manhattan averaged about 4.5% per year, not adjusted for inflation. Given the recent era of low wage growth and inflation, the increases in the rental market are impressive with 3% average annual growth for Manhattan and Brooklyn and 2% for Queens. The Queens growth rate is lower only because development started there later.

Also, regarding absorption, on an empirical basis, our experience with leasing new rental developments shows that the rate of absorption has not changed significantly since pre-Lehman days. This also tends to show that supply is not building up. So, with supply being absorbed as it is delivered to market, we can now look at the impact of future diminished supply on rental pricing.

Supply/Rent Analysis

We did an analysis between prior year's percentage change in supply and the subsequent year's percentage change in rent and assuming demand is constant and a non-factor in the analysis. The results were a strikingly low error rate in reproducing achieved rents.

The following data for Manhattan Core is taken from Nancy Packes Data Services Transactions Database. Supply was defined as Market Rate Rental Units in Manhattan Core, provided by NPDS Pipeline Database. Rent was defined as weighted average rent for Studios, One Bedroom, Two Bedroom and Three Bedroom unit types in rental buildings in Manhattan Core. Additional functions were created to calculate percent change in rent and percent change in supply.
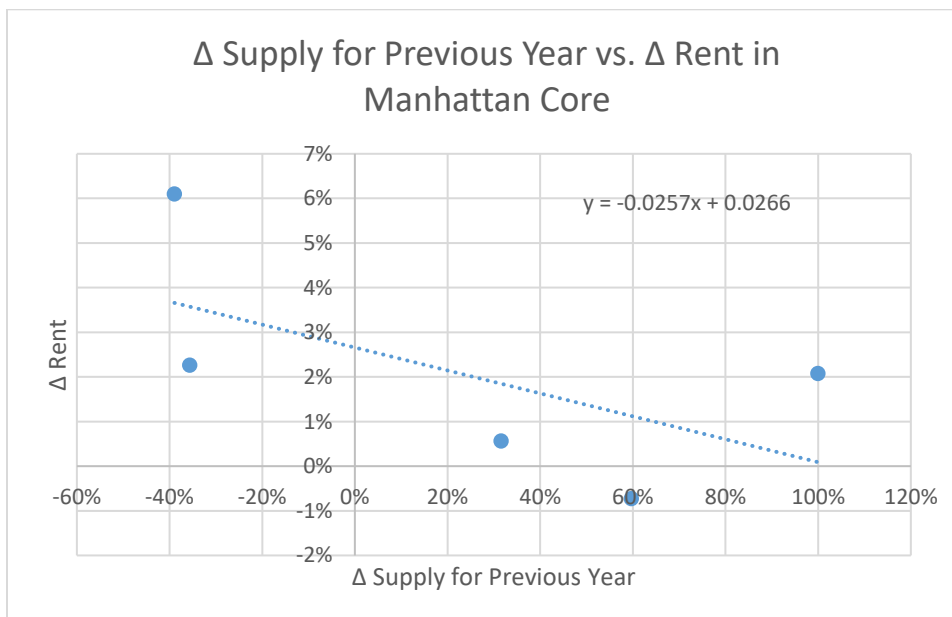
Manhattan Core				
	Supply	Δ Supply	Rent	Δ Rent
2012	1851	-36%	$ 3,928	
2013	2435	32%	$ 4,017	2%
2014	1487	-39%	$ 4,040	1%
2015	2973	100%	$ 4,287	6%
2016	4746	60%	$ 4,376	2%
2017	3368	-29%	$ 4,344	-1%

*Supply for 2011 was 2877. Source: Nancy Packes Data Services

Then percent change in rent was correlated to percent change in supply for previous year.

Manhattan Core	
Δ Supply For Previous Year	Δ Rent
-36%	2%
32%	1%
-39%	6%
100%	2%
60%	-1%

Based on this, a scatter plot was generated with X-Axis corresponding to percent change in supply and Y-Axis corresponding to percent change in rent. This formed a trend line that described the relationship in a linear fashion. The equation of this trend line can be used to project the percent change in rent when the percentage change in supply is known.

Δ Supply for Previous Year vs. Δ Rent in Manhattan Core

$y = -0.0257x + 0.0266$

To determine how well this correlation worked, we used the historical rent data and applied the equation of the trend line.

Manhattan Core		
Reproduced Rent	Δ Rep Rent	% Error
$ 3,928		0.0%
$ 4,068	4%	1.3%
$ 4,144	2%	2.6%
$ 4,295	4%	0.2%
$ 4,299	0%	-1.7%
$ 4,348	1%	0.1%
Average Error		0.5%

When comparing reproduced rent to actual rent, there was, on average, a 0.5% error rate, and no greater than 2.6% error rate in any given year's reproduced rent.

With such low error rates, we then proceeded to apply the equation of the trend line to future supply, from the NPDS Pipeline Database resulting in the projected rents in the chart below.

Manhattan Core				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 4,492	3%
2019	2305	-44%	$ 4,587	2%
2020	1403	-39%	$ 4,761	4%
2021	1012	-28%	$ 4,935	4%
2022			$ 5,102	3%
			Annual	3.27%

Average annual rent growth was calculated by compound annual rate growth (CARG) formula from 2017 to 2022, equaling 3.27%.

Please find attached the work books for all calculations.

The charts below show the application of this trend line analysis to the past five years of rental prices. Manhattan Core, Manhattan Non-Core, Brooklyn Core and Brooklyn Non-Core displayed an average correlation error of less than 2%. Queens Core and Queens Non-Core analyses displayed an average correlation error of less than 15%. Please note, the higher error rate for Queens resulted from understating rents actually achieved. We then analyzed Astoria separately and the error rate was very low at -1.2%. Again, the negative error rate means achieved rents were underestimated.

Such low error rates for Manhattan and Brooklyn, where supply levels were more substantial and the analysis more potent, mean that this analysis accurately reproduced rents and can therefore be applied

to predict future rents because we can estimate future supply at least through 2022, again assuming demand is constant.

Manhattan Core							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	1851	-36%	$ 3,928		$ 3,928		0.0%
2013	2435	32%	$ 4,017	2%	$ 4,069	4%	1.3%
2014	1487	-39%	$ 4,040	1%	$ 4,144	2%	2.6%
2015	2973	100%	$ 4,287	6%	$ 4,296	4%	0.2%
2016	4746	60%	$ 4,376	2%	$ 4,300	0%	-1.7%
2017	3368	-29%	$ 4,344	-1%	$ 4,348	1%	0.1%
Annual Rent Growth				2%	Average % Pro. Error		0.5%

Manhattan Non-Core							
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	265	-61%	$ 2,118		$ 2,118		0.0%
2013	102	-62%	$ 2,159	2%	$ 2,207	4%	2.2%
2014	365	258%	$ 2,228	3%	$ 2,301	4%	3.3%
2015	91	-75%	$ 2,259	1%	$ 2,210	-4%	-2.2%
2016	580	537%	$ 2,471	9%	$ 2,311	5%	-6.5%
2017	366	-37%	$ 2,360	-4%	$ 2,054	-11%	-13.0%
Annual Rent Growth				2%	Average % Pro. Error		-3.2%

Brooklyn Core							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	845	-23%	$ 3,270		$ 3,270		0.0%
2013	1607	90%	$ 3,188	-3%	$ 3,377	3%	5.9%
2014	1905	19%	$ 3,283	3%	$ 3,388	0%	3.2%
2015	2877	51%	$ 3,468	6%	$ 3,462	2%	-0.2%
2016	1310	-54%	$ 3,528	2%	$ 3,509	1%	-0.5%
2017	3066	134%	$ 3,683	4%	$ 3,651	4%	-0.9%
Annual Rent Growth				2%	Average % Pro. Error		1.5%

Brooklyn Non-Core							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	531	-23%	$ 2,778		$ 2,778		0.0%
2013	785	48%	$ 2,603	-6%	$ 2,868	3%	10.2%
2014	1079	37%	$ 2,863	10%	$ 2,909	1%	1.6%
2015	501	-54%	$ 3,049	6%	$ 2,959	2%	-2.9%
2016	2034	306%	$ 3,136	3%	$ 3,078	4%	-1.8%
2017	4659	129%	$ 3,195	2%	$ 2,918	-5%	-8.7%
Annual Rent Growth				3%	Average % Pro. Error		-0.3%

Queens Core							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	807						
2013	2282	183%	$ 2,868		$ 2,868		0.0%
2014	1251	-45%	$ 2,515	-12%	$ 2,810	-2%	11.7%
2015	476	-62%	$ 3,620	44%	$ 2,917	4%	-19.4%
2016	1273	167%	$ 3,441	-5%	$ 3,041	4%	-11.6%
2017	3531	177%	$ 3,424	-1%	$ 2,991	-2%	-12.6%
Annual Rent Growth				5%	Average % Pro. Error		-6.4%

Queens Non-Core							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	392						
2013	396	1%	$ 1,493		$ 1,493		0.0%
2014	291	-27%	$ 1,923	29%	$ 1,532	3%	-20.4%
2015	582	100%	$ 2,052	7%	$ 1,583	3%	-22.8%
2016	293	-50%	$ 2,113	3%	$ 1,584	0%	-25.0%
2017	145	-51%	$ 2,265	7%	$ 1,647	4%	-27.3%
Annual Rent Growth				11%	Average % Pro. Error		-23.9%

Astoria							
	Historical Data				Projected Rent Based on Historical Data		
	Supply	Δ Supply	Rent	Δ Rent	Reproduced Rent	Δ Rep Rent	% Error
2012	158	243%	$ 2,203		$ 2,203		0.0%
2013	203	28%	$ 2,053	-7%	$ 2,023	-8%	-1.4%
2014	213	5%	$ 2,023	-1%	$ 2,117	5%	4.7%
2015	118	-45%	$ 2,427	20%	$ 2,245	6%	-7.5%
2016	255	116%	$ 2,518	4%	$ 2,447	9%	-2.8%
2017	145	-43%	$ 2,404	-5%	$ 2,432	-1%	1.2%
Annual Rent Growth				2%	Average % Pro. Error		-1.2%

*Average % Projected Error signifies the deviation of the projected rent from historical average rent for 0, 1, 2 and 3 bedroom unit type. Please see attached Workbook for calculations.

Please note, negative percentage errors mean that the predicted rent was lower than the actual rent achieved. This is especially important when considering Queens Core and Non-Core, where Average Percent Projected Rent are -6.4% and -23.9%. Therefore, when the same model is applied to predict future rents, the predictions will be conservative.

The analysis recognized that the prior year's change in supply was correlated to the subsequent year's rent prices in a linear fashion. This also proves that supply is being absorbed as it comes to market. Looking at the boroughs on the whole, we can project rent growth over the next several years where we have reliable estimates from our Database as to the number of rental units to be delivered to the area each year. Beyond the next four years, the analysis is not tenable because buildings which will be delivered after that time have, in general, not yet begun the permitting process.

For Manhattan, Brooklyn and Queens, the charts below show projected rent growth through 2022. Again, supply numbers are from the Nancy Packes Data Services Pipeline Database

Manhattan Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 4,492	3%
2019	2305	-44%	$ 4,587	2%
2020	1403	-39%	$ 4,761	4%
2021	1012	-28%	$ 4,935	4%
2022			$ 5,102	3%
			Annual	3.27%

Manhattan Non-Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 2,445	4%
2019	2305	-44%	$ 2,497	2%
2020	1403	-39%	$ 2,591	4%
2021	1012	-28%	$ 2,686	4%
2022			$ 2,777	3%
			Annual	3.31%

Brooklyn Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 3,654	-1%
2019	2305	-44%	$ 3,731	2%
2020	1403	-39%	$ 3,872	4%
2021	1012	-28%	$ 4,014	4%
2022			$ 4,149	3%
			Annual	2.42%

Brooklyn Non-Core Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 3,174	-1%
2019	2305	-44%	$ 3,241	2%
2020	1403	-39%	$ 3,364	4%
2021	1012	-28%	$ 3,487	4%
2022			$ 3,605	3%
			Annual	2.44%

Queens Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 3,359	-2%
2019	2305	-44%	$ 3,430	2%
2020	1403	-39%	$ 3,559	4%
2021	1012	-28%	$ 3,690	4%
2022			$ 3,815	3%
			Annual	2.18%

Queens Non-Core Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	4086	21%	$ 2,355	4%
2019	2305	-44%	$ 2,404	2%
2020	1403	-39%	$ 2,495	4%
2021	1012	-28%	$ 2,587	4%
2022			$ 2,674	3%
			Annual	3.38%

Astoria Projected Rent Based on Pipeline Data				
	Supply	Δ Supply	Projected Rent	Δ Pro Rent
2018	422	191%	$ 2,618	9%
2019	898	113%	$ 2,486	-5%
2020	1443	61%	$ 2,477	0%
2021	0	-100%	$ 2,544	3%
2022			$ 2,856	12%
			Annual	3.51%

*Annual rent growth is compound annual growth rate (CAGR) calculated by the difference in rents from 2017 to 2022.

What happens after that? Under the policies of the current mayoral administration there has been little up zoning. Most increase in density has been granted on a spot zoning, or case by case basis. Thus, it will be difficult to create new supply going forward. So, on the supply side of the analysis the metrics seem compelling that starting in 2020 for Manhattan and Brooklyn and in 2021 for Queens, rental prices will begin substantial annual growth, assuming demand remains constant.

DEMAND

Now that we've sorted through the quantifiable issue of the impact of supply on rental pricing, we will discuss the much more complex multi-factored aspects of demand. First and foremost, obviously rental housing demand grows with job growth, as does the demand for "for sale" housing. However, unlike in the past, sectors like retail are growing far less rapidly and sectors including law, finance and the newer information industries are growing much more rapidly as a proportion of local area job growth. These higher paying industries fuel the sale and market rate rental demand much more than retail and service sector job growth does.

Secondly, the major cities are gaining population and the suburbs and smaller cities are losing it. This is a global, not merely local, phenomenon. In this trend, we see demand from the family household, where both husband and wife work. A choice that could have been made in earlier decades to live in the suburbs to raise a family depended primarily on one parent being at home. Today, that situation is rarer and families where both parents work have come into the City in large numbers.

Concerning these urbanized families, in prior years, the choice would have been to buy. However there are trends operating that have changed this calculus towards renting. First, sale prices have become so high that the level of wealth needed to enter the "for sale" housing market for a family-sized apartment has become prohibitive for many people.

It is interesting to note that the City has reacted to this by empowering the EDC to build schools in conjunction with the creation of rental housing density to give families an option to remain in the rental market while their children attend these tuition free schools. Much more needs to be done with regard to the creation of new public schools to enable families to remain in the City. Indeed, as families mature in years and as their families grow, typically, their household wealth also grows. Losing these more affluent taxpayers to the suburbs makes little sense.

A second trend has been that many individuals have chosen to buy a weekend home outside the City and to rent in the City. Part of the reason for this is the increase in "for sale" housing prices, but owning a piece of land and contact with nature are highly valued as well.

A third factor increasing the demand for rentals is the generally lower level of rental pricing available in the outer boroughs as compared to Manhattan. Not so long ago, corporations often complained of the inability to relocate to the City because of the difficulty in finding affordable rental housing for their employees. As a result of this phenomenon, the housing market on the New Jersey coastline was created. More recently the discovery of the outer boroughs as a suitable location for rental {and "for sale" housing} has enabled companies to relocate to the City and to house their employees at more affordable levels. The continued expansion of development in the outer boroughs will increase affordability and benefit the City's economy.

So, in effect, the expansion of the rental market into the outer boroughs that resulted in lower pricing has in fact promoted the demand for rental housing. What is important to note here is that development in the outer boroughs began as recently as 2006 and that the saga is nowhere near complete.

It is safe to say that the demand for rental housing, as an overall percentage of the demand for new housing in the City, will continue to grow. How long it will take for the market to reach a dynamic

equilibrium where net demand is no longer coming from Manhattan, or from Brooklyn into Queens is, at this point, not knowable.

So, in looking back at our charts predicting rental growth over the next few years, we assumed constant demand. In fact, it is highly probable that the demand for rental housing is growing, so that the estimates we calculated earlier will probably understate the reality of rent growth.

Just how understated those numbers are is perhaps the trickiest question of all. That is because, even as demand grows, the geographic area into which the rental housing market is expanding includes the entire boroughs of Brooklyn, Queens and the Bronx. Even Staten Island, with its somewhat tenuous transportation connections to Manhattan, may soon see increased rental market development.

And, if Manhattan was never really isolated as a housing market, then the five boroughs of the City of New York are not either. Memory does not have to be stretched too far to remember pre Lehman, the development of market rate rental and "for sale" housing in Westchester and at local train stops all around the City.

While it is too early in the geographic expansion to calculate precisely how the full extent of this build out will affect rental market pricing, certain factors are nonetheless clear.

Competition from other land uses has shifted significantly. It seems that all industries are undergoing a transformation where machines are replacing human beings, not only for their labor capacities but for their mental abilities. Thus, we need less office space, less retail space and less manufacturing space. Perhaps only warehouse and other storage needs resulting from the e-commerce revolution are a new aspect on the land use horizon.

So, the value of land is less because of fewer uses, but increased construction and operating expenses increase costs. And, long term, demand is growing. The end game cannot be foreseen.

INTRA BOROUGH RENT DYNAMICS

So finally, we come to the most interesting and complex of all of the topics regarding pricing between Manhattan and the outer boroughs. Based on empirical observation, early on in the development of rental market housing in the outer boroughs just before Lehman, 50% of all demand came from then current residents of Manhattan. The astonishing fact is that 12 years on, 50% of all demand for outer borough rentals is still coming from current Manhattan residents.

This means that we have not yet reached dynamic equilibrium in pricing between Manhattan and core Brooklyn, no less the farther out points of Brooklyn or Queens. The chart on page 4 shows clearly that, in the early years post Lehman, growth in Brooklyn rents was primarily concentrated in the studio and one bedroom units and loss of rental growth in Manhattan was also associated with the smaller unit types. But, more recently, growth in the Brooklyn rental market has included 2 bedroom units and the loss of pricing power in Manhattan has extended to that unit type as well.

Percent Difference Between Manhattan Core and Brookyn Core Rents by Unit Type
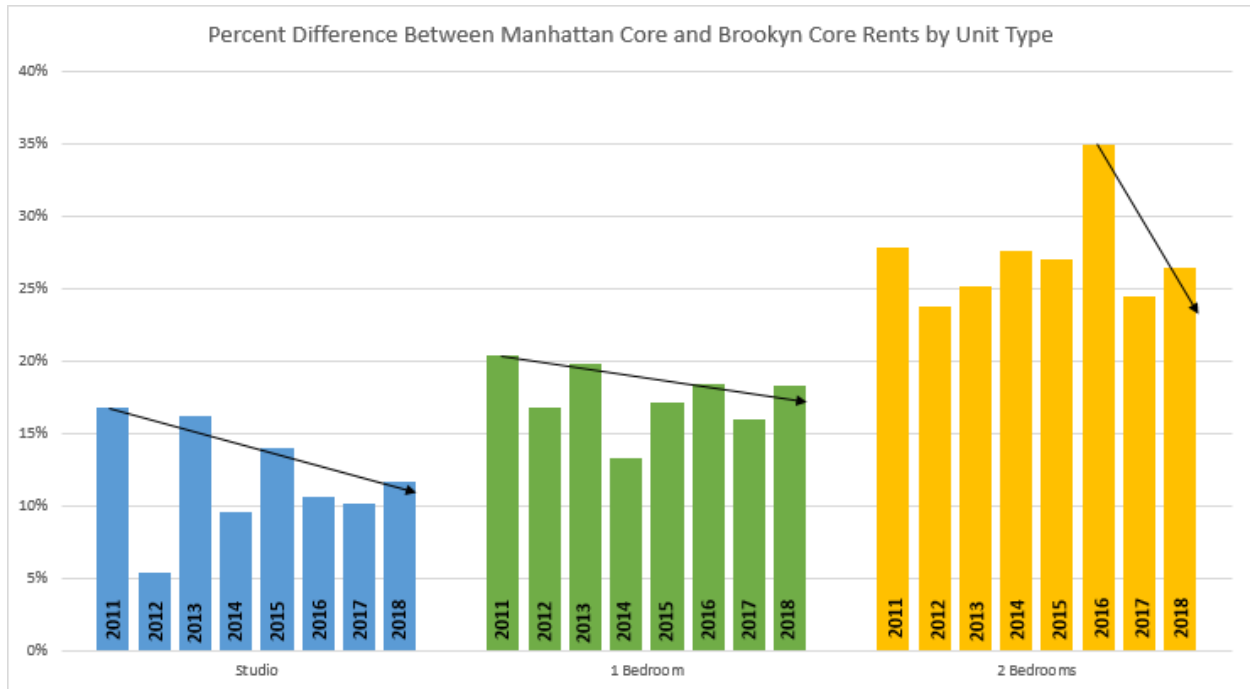
As the graph above illustrates, the percentage difference between Manhattan Core and Brooklyn Core rents have been gradually decreasing for the past 7 years for Studios and 1 Bedrooms. This means that the rate of rent growth in Manhattan Core was smaller than the rate of rent growth in Brooklyn Core, resulting in reduction of the gap between the two areas. Two Bedroom unit types only recently joined this trend, after 2016.

The meaning here is that, what began as a value option for the Manhattan renter to live in Brooklyn, has turned into a lifestyle option, where Brooklyn has become a destination of choice. That explains how 50% of the demand can still be coming from residents of Manhattan, even as the pricing gap has closed as significantly as it has between the core Brooklyn neighborhoods and Manhattan.

While only Manhattan is recognized as having areas such as Midtown, Midtown West and the Upper West Side, the outer boroughs have not yet achieved such designations. We suggest, however, that core neighborhoods in Brooklyn have already been established including: Williamsburg, Dumbo, Brooklyn Heights, Vinegar Hill, Downtown Brooklyn and Fort Greene.

Brooklyn Core Map
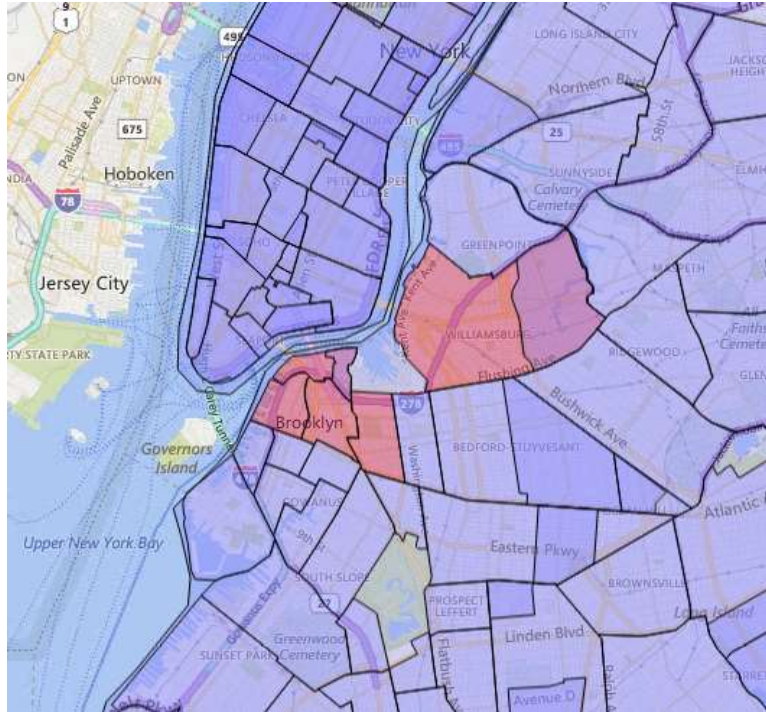
Also, we suggest that the definition of core is that the size of the building is less relevant to its pricing than the fact of its location. In other words, being a core neighborhood has a greater impact on a building's value than the size of the building.

To test this hypothesis, we used Downtown Brooklyn and compared it to the ring of neighborhoods just around it that we have designated as Non-Core. We obtained average one bedroom rents, curtesy of Nancy Packes Data Services Transactions Database, for the past year in attended rental buildings. The charts below demonstrate that, for buildings in the Downtown Brooklyn, the rental price is almost invariant with regard to the size of the building.

**Rent for 1 Bedrooms vs Units in the Building
Brooklyn Non-Core**
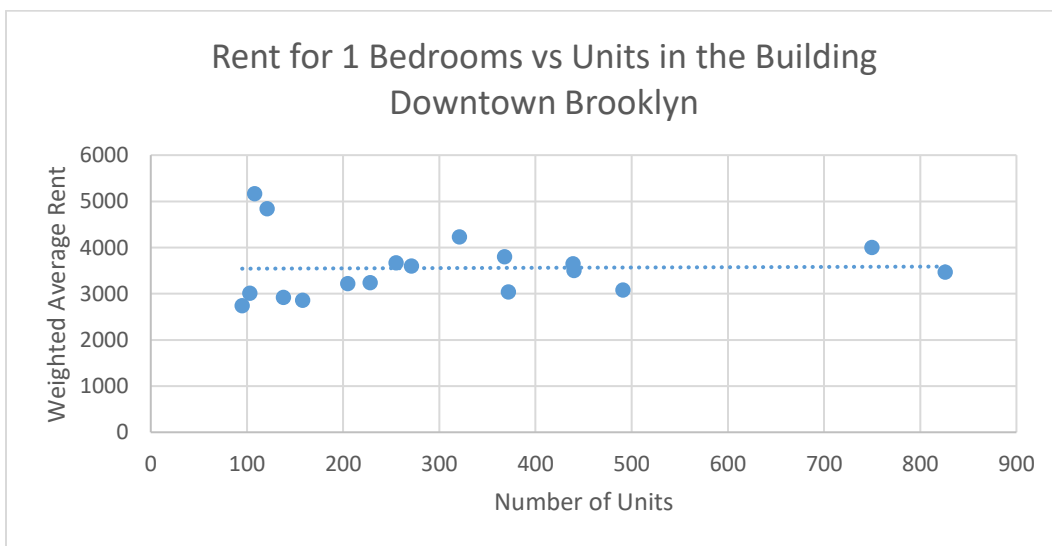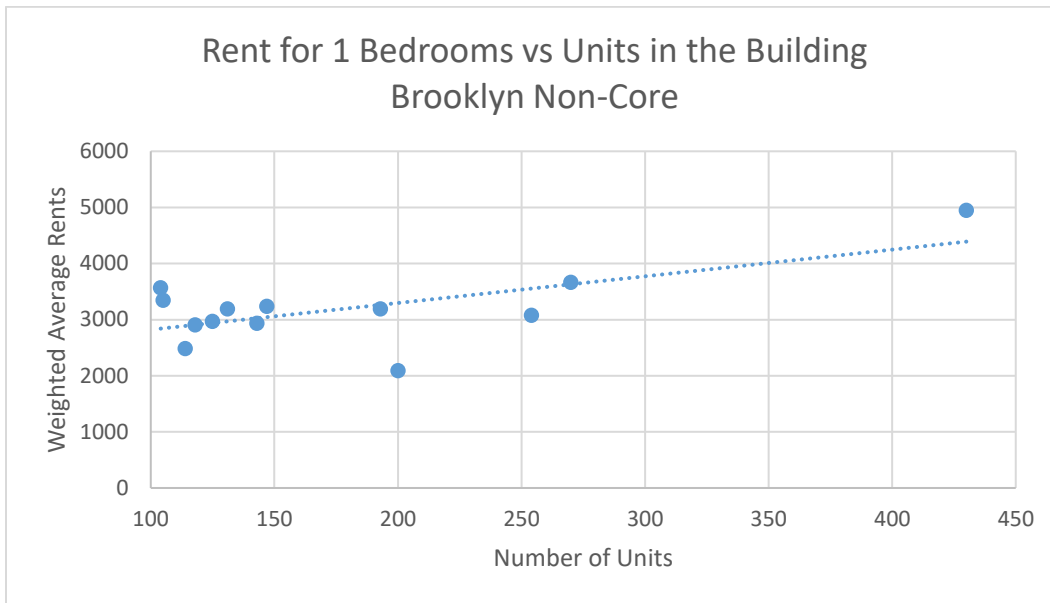
Dotted lines in the charts represent the "best-fit line", which can be used to observe trends and patterns. Upon examination, Downtown Brooklyn displayed low slope, almost horizontal, meaning that the number of units in the building did not affect average rents. For Brooklyn Non-Core, the slope was steep, meaning that the number of units in the building had a positive effect on average rents. So, this functional definition for core Brooklyn neighborhoods seems justified.

When looking at Manhattan in a similar fashion, analogous results can be observed for Manhattan Core and Non-Core.

**Rent for 1 Bedrooms vs Units in the Building
Manhattan Core**

Rent for 1 Bedrooms vs Units in the Building Manhattan Non-Core
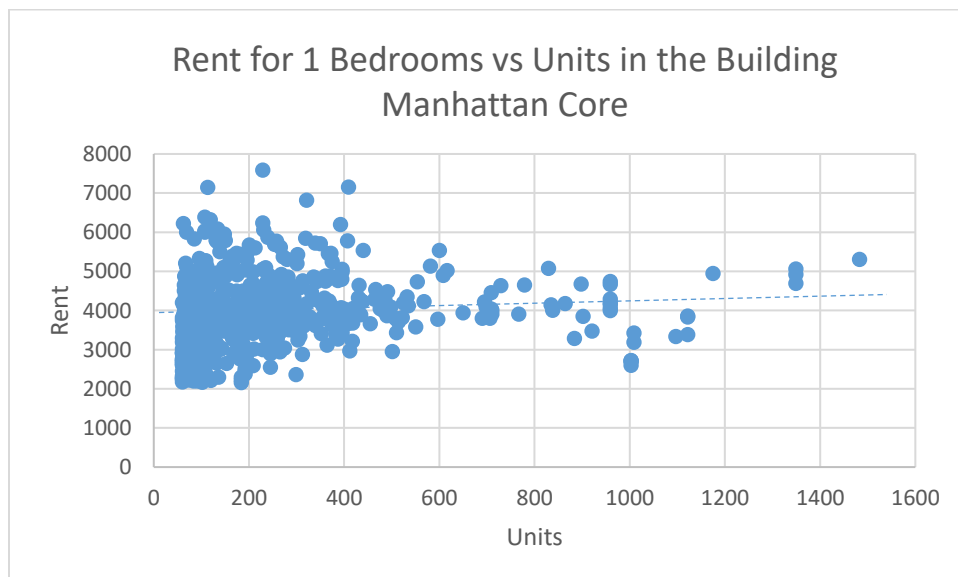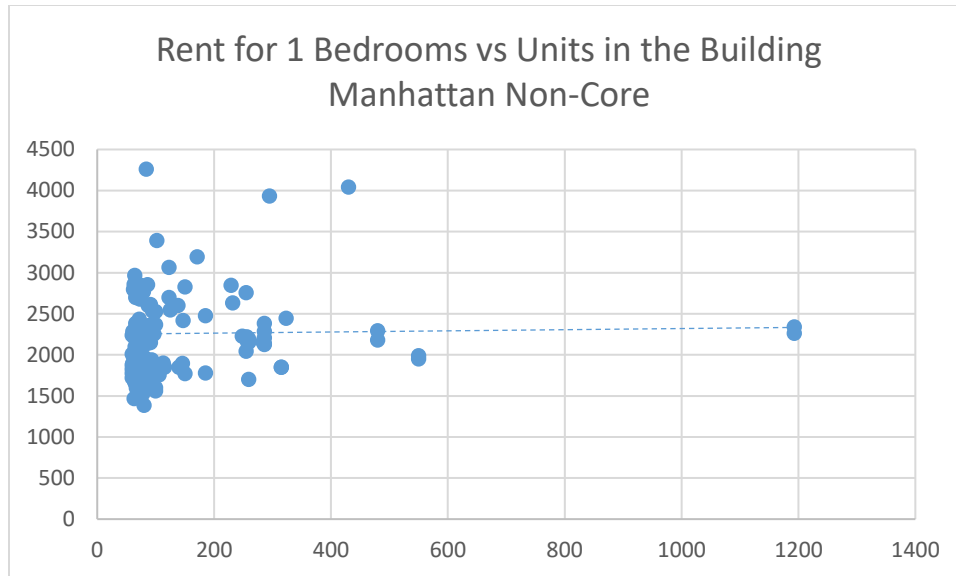
Please note, both Manhattan Core and Non-Core have fairly low slopes, signifying that in both of these areas building size has little effect on rents. When looking at the chart on page 4, it is evident that both areas operate similarly, due to similar total rent growth since 2010, 25% for Manhattan Core and 27% for Manhattan Non-Core. This suggests that what is currently defined as Manhattan, Non-Core has become Core.

An interesting consequence of the importance of a building's size to the rent achieved in a non-core area is that a large building can achieve values usually only realized in core neighborhoods. A building with more than 400 units in Brooklyn Non-Core has achieved rents for 1 bedroom units at $5000, a higher value than most of Brooklyn Core buildings of similar sizes.

Core neighborhoods are desirable because their values are stable. The choice of location is the prerogative of the more affluent in the population. Lifestyle renters tend to suffer less in economic downturns, hence the stability of core neighborhood values. Of course, over time, more neighborhoods can be within core ,but for the present we suggest that the analyses above demonstrates what has become core in Brooklyn and what is still on the periphery.

Renters of smaller units, especially studios, will opt for farther out locations and larger sized homes for the same price as non-core areas expand.

Also, what will happen to older and less desirable Manhattan rental buildings that lose their renters to Brooklyn and Queens? Many of them will convert to condominiums and cooperatives. Coincidentally, tax benefits will be expiring for many of the older Manhattan rental buildings, making them additionally uncompetitive with the new outer borough housing stock. We think the destiny of these buildings is to become entry level "for sale" housing, a sorely needed commodity in Manhattan.

It is not easy to navigate the design and development of buildings in core Brooklyn and Queens neighborhoods, given the sensitivity of smaller unit renters to price increases associated with core neighborhoods and the increasing option of renting a little farther away on the train line.

While the issues associated with the expansion of the City's rental market are complex, nevertheless its future is bright with demand increasing and room to grow.