

Worth the Cost?

An Examination of the
Commercial Revitalization &
Commercial Expansion Programs



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Summary & Acknowledgements

With Lower Manhattan commercial vacancy rates rising and employment falling, the Giuliani Administration crafted the Commercial Revitalization Program, which the State Legislature approved in 1995. The program provided subsidies to commercial tenants, encouraging them to renew or sign new leases in Lower Manhattan. To qualify for the subsidies, which include a property tax abatement and commercial rent tax reduction, the leased space must be in a building built before 1975 and at least \$5 per square foot needs to be invested in upgrades to the space (firms with more than 125 employees have to spend more). In 2000, the Commercial Expansion Program was created to bring some of these benefits to areas north of 96th Street in Manhattan and the rest of the city.

In 2017 the two programs cost the city \$27 million in foregone revenue, or as these subsidies are more formally called, tax expenditures. Has this been money well spent? Did it achieve the goals of spurring occupancy in Lower Manhattan commercial buildings and jobs growth? Among the findings in IBO's examination of the efficiency and effectiveness of the two programs:

- Both before and after the Commercial Revitalization Program started, commercial vacancy rates and employment in Lower Manhattan followed similar trends as the rest of the city. IBO's analysis suggests that the program did not decrease vacancy rates and had little, if any, effect on employment.
- Over 60 percent of participants in the Commercial Revitalization Program spent more on upgrades to their office or commercial space than they received in tax abatements. This suggests that many of these participants would have spent at least their required \$5 per square foot absent the program. This is less pronounced among Commercial Expansion Program participants, about 40 percent of whom spent close to their required \$2.50 per square foot on upgrades for firms with fewer than 125 employees.
- On average less than 30 percent of the physical improvements made in conjunction with the two programs are reflected in property tax assessments of participating buildings. The failure to capture the value of these upgrades in building assessments means that over the years the city has likely lost potential tax revenue.

IBO's analysis relied on a variety of data sources for this report, including application forms for the Commercial Revitalization and Commercial Expansion Programs, Manhattan office rent and vacancy rate reports, federal employment by industry and city zip code information, and Department of Finance property tax records. But IBO encountered a number of limitations

in the available data. For example, applications for the revitalization and expansion programs prior to 2005 had been destroyed. And it was not until last year that data on the commercial rent tax specifically noted reductions related to the Commercial Revitalization Program. To facilitate better evaluations of any tax expenditure programs created in the future, enabling legislation should include guidelines for record-keeping.

This report is the first produced under the terms of a law passed by the City Council in 2017 that turned to IBO to issue periodic evaluations of New York City economic development tax expenditure programs. The tax expenditure to be studied in each evaluation is determined collaboratively with the City Council. The legislation was adopted under the leadership of former Council Speaker Melissa Mark-Viverito and former Finance Committee Chair Julissa Ferraras-Copeland. Our work in conjunction with the City Council has continued seamlessly under the leadership of Council Speaker Corey Johnson and Finance Chair Daniel Dromm. The City Council's chief economist, Raymond Majewski, has also played an invaluable role.

1. Introduction

The Commercial Revitalization Program (CRP), which was established in 1995, subsidizes tenants who renew or sign new leases to occupy Lower Manhattan commercial space, provided that the building was built before 1975 and qualifying investments were made to upgrade the space for the tenancy. The subsidy is provided through property tax abatements and commercial rent tax reductions. In 2000, the Commercial Expansion Program (CEP) extended similar benefits to the outer boroughs and Manhattan north of 96th street. Together, these programs cost New York City \$27 million in fiscal year 2017.¹

This report presents the results of the first comprehensive evaluation of the extent, effectiveness, and efficiency of the CRP and CEP tax expenditures. Under a local law passed by the City Council in early 2017, the Administrative Code of the City of New York was amended by adding § 11-2901 establishing a process for regular evaluations of economic development tax expenditure programs by the Independent Budget Office, in consultation with the City Council. The law calls for IBO to evaluate effectiveness of these programs in achieving their goals, the relevance of such goals going forward, and their consistency with other policies and economic development programs. This report is the first completed under the legislation. It begins by describing the CRP and CEP programs, the available data, and the methodology used for the evaluation before presenting the main results. The report concludes with the evaluation results, a discussion of data limitations, and suggestions for future evaluations.

Although the legislation establishing CRP and CEP did not identify specific goals for the programs, using the text of the legislation as well as statements of supporters of the programs and material produced by the city as they were being enacted, IBO and the City Council determined that the goals were to increase employment and reduce office vacancy rates in Lower Manhattan. This evaluation did not show CRP or CEP to be effective in these regards.

Lower Manhattan office vacancy rates and employment follow the same trends as in other areas before and after 1995, when CRP was put in place. Although office vacancy rates in Lower Manhattan were particularly high in early 1990s, so were those in Midtown, Midtown South, and the Hudson waterfront on the New Jersey side. Lower Manhattan office vacancy rates sharply dropped after 1995, but so did the vacancy rates of all those other areas which did not have CRP. After removing the overall market trends from these data series, the data does not show any statistically significant effect of CRP on these vacancy rates.

Employment numbers across the CRP- and CEP-eligible areas also trended similarly to those of ineligible areas. Even after controlling for the different mix of industries across office markets, employment grew more rapidly in Midtown than in Lower Manhattan. Of course, this may be partially due to the overlapping effects of other programs, such as 421-g, which subsidized conversion of older commercial buildings to residential, thereby removing those buildings as competitors in the market for office space.

CRP and CEP both require the participants to make minimum physical improvements to the leased space and submit the receipts to the Department of Finance. About 62 percent of the CRP participants spent more than double these minimum requirements. Using an economic framework that considers the participants' expenditures in excess of program subsidies, IBO's analysis suggests that most of the participants would have made similar physical improvements regardless of CRP. For CEP participants, only 37 percent of whom spend more than double their requirement, the evidence that such investment would have occurred in the absence of the program is less clear.

Furthermore, on average, only 29 percent of the CRP and CEP physical improvements are captured by the city's property tax system as additions to assessed value and hence the tax base. Since physical improvements to a building should be reflected in higher assessments and potentially higher taxes in subsequent years, failure to capture these improvements has potentially led to lost revenue for the city.

This report also assesses the relevance of lowering office vacancy rates and increasing employment and their consistency with other programs. Using public resources in the form of tax benefits to reduce commercial vacancy rates does not have a solid basis in economic theory because it does not address any market failures. Additionally, the program has continued and been extended even though the office vacancy rates are no longer in the 20 percent range. Since 2000, Lower Manhattan office vacancy rates have ranged from 3.5 percent to 13.5 percent and averaged 8.5 percent for the 18 years—very similar to the average in Midtown. On the other hand, creating well-paying jobs is consistent with the goal of success in inter-regional competition for economic growth. However, CRP and CEP are not specifically designed to encourage such jobs. By requiring additional physical improvements for larger firms, these programs may even discourage employment growth. IBO's analysis also shows that often times other programs are used concurrently with CRP and CEP. Since there is no law to prohibit using the same physical improvements to participate in multiple programs, some of the CRP and CEP participants may be doing so.

Finally, this report discusses the data limitations and makes some suggestions for future work. For example, office vacancy rates are currently collected by the Department of Finance in Real Property Income and Expense (RPIE) forms, but IBO does not have access to them. If historical building level data on owners' rental income or vacancy rates had been available, more robust empirical strategies could have been used to extend

the findings of this report. At the same time, some data were simply not collected or digitized going back to 1990s. For example, the commercial rent tax data system did not specifically record CRP reductions until 2017. On the other hand, CRP and CEP applications were only digitized after 2010 and completely destroyed for 2005 and prior years. Going forward, solving or preventing these and similar issues can greatly enhance the design and evaluation of subsequent economic development tax incentives, as required by the new legislation.

2. Description of Tax Expenditures

In the mid-1990s the Lower Manhattan commercial real estate market was still reeling from the after-effects of the city's 1989-1993 recession, which had cost the city over 350,000 jobs. At the same time, technological changes had rendered many of the area's older office towers obsolete and uncompetitive when vying for tenants looking for the computer and telecommunications infrastructure to support their operations. Lower Manhattan office vacancy rates had grown from 11 percent in 1984 to almost 23 percent by 1993.

In response, in 1995, the city requested the State Legislature to enact a package of business incentive programs. One of these new programs, the Commercial Revitalization Program, was designed to increase tenant occupancy in office and retail space in Lower Manhattan. Other new programs encouraged the conversion of older office buildings to residential use in order to transform downtown into a 24-hour community with homes and services along with office uses.

The CRP program provides real property and commercial rent tax subsidies linked to investment in upgrades of nonresidential buildings in Lower Manhattan built before 1975. The subsidies are triggered when tenants sign new or renewal leases in eligible buildings in the area south of Murray Street to the west and Frankfort Street to the east. There are minimum lease terms and minimum required physical improvements in order to receive the subsidies.

In 2000, the State Legislature enacted the Commercial Expansion Program to promote the development of commercial and industrial areas outside of Manhattan's central business districts. Within the CEP area, any building built before 1999 that is not being used for retail, hotel, or residential purposes is eligible for the program. The requirements and property tax benefits are very similar to those of the CRP program. However, there is no commercial rent tax (CRT) benefit under CEP because the tax had been eliminated in 1995 in Manhattan north of 96th Street and in the other four boroughs—an area that matches the CEP eligibility area. The 2000 legislation also extended the provisions of the CRP program through 2005.

In 2005, in conjunction with the renewal of the CRP and CEP programs by the State Legislature, the commercial rent tax benefits of the CRP program were expanded in major ways. Eligibility was broadened to include all buildings located south of Canal Street, regardless of age. Buildings in the Special Garment District that were already eligible for the CEP program were also granted the CRT special reduction. The Special Garment District is considered an industrial area and includes most of the area in Manhattan from 35th to 40th Streets, and west of Broadway as far as 9th Avenue. Also, the last two year phaseout reductions were removed—effectively the benefits were

increased in value by 20 percent.

The 2005 legislation also exempted all leases in the new buildings at the World Trade Center site from the CRT as well as all leases for retail use in buildings south of Murray/Frankfort Streets, regardless of the building’s age. The tax expenditures associated with these latter two exemptions are not included in the cost of the CRP program itself.

The rest of this section discusses the historical context, goals, and benefits and requirements of these programs.

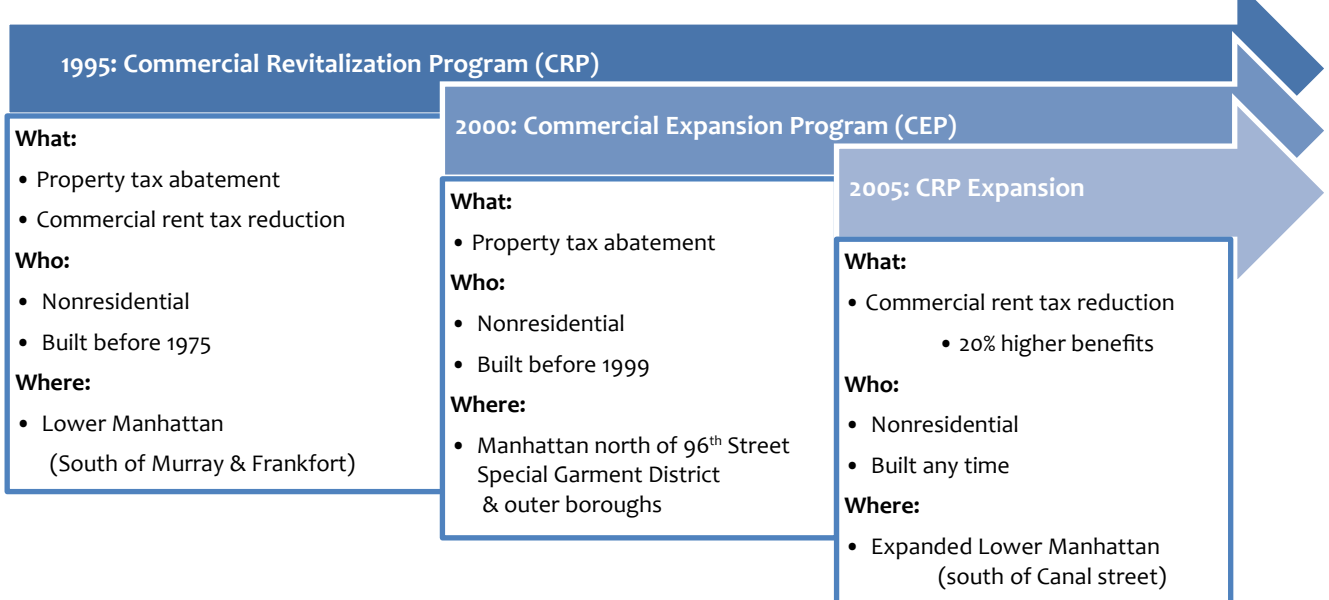
2.1 Historical Context

After a long period of economic expansion, United States economic growth began to slow in the early 1990s and slipped into a relatively mild and brief recession in 1990. New York City experienced a more severe and protracted economic downturn that began in 1989 and lasted through much of 1993 (discussed below). Unemployment rates and office vacancy rates in the city both rose sharply in response to the downturn. Even after economic conditions citywide began to improve, however, office vacancy rates in Lower Manhattan remained stubbornly high.

Office vacancy rates in New York City had been on the rise since 1987, well before the early 1990s recession.² Downtown office vacancy rates rose from 10.8 percent to 22.7 percent—more than doubling from 1985 through 1993. Midtown office vacancy rates almost tripled, rising from 6.4 percent to 18.5 percent. By the end of 1995, though, Midtown vacancy rates had recovered to 12.7 percent. Downtown vacancy rates, on the other hand, were still at 20.2 percent. One factor often cited to explain Lower Manhattan’s persistently high office vacancy rates was a long-term shift in tenants’

Figure 2-1

Evolution of the Commercial Rent Tax Over Time



SOURCES: New York State Real Property Tax Law § 499a – 499h and New York City Administrative Code § 11-704(i)

New York City Independent Budget Office

preferences for newer office buildings with sufficient electrical and cooling capacity to support the computer and telecommunications needs of modern office users. In particular, there was a preference for buildings with wide, column-free floor plans to build trading floors and open bullpen-style offices. In Lower Manhattan, where many of the largest office buildings dated from before the Second World War and were plagued with internal structural columns that broke up the space, it was difficult to compete with newer buildings more commonly found in Midtown and on the New Jersey side of the Hudson River. While some landlords might have looked to tear down their older buildings and replace them with new structures, the existing zoning in the financial district would have required that in many cases replacement buildings have less size and less bulk than the existing buildings, thereby discouraging replacement.

Concerned that the very high office vacancy rates in Lower Manhattan would persist and recognizing that at least some of the vacant space would probably never be competitive again without significant investment or conversion to some other use, the city developed a package of incentives in 1995, including the Commercial Revitalization Program.

According to testimony by Deputy Mayor Fran Reiter on February 28, 1995 at an Economic Development Committee hearing of the City Council, “The plan for the revitalization of Lower Manhattan was designed to stem and turn around the decline in the economy of Lower Manhattan.” According to the Deputy Mayor, while Midtown had started to slowly recover in 1994, Lower Manhattan was plagued by structural issues, including a heavy reliance on the finance industry as users of office space in the area and an aging building stock. The Mayor’s memorandum submitted while the legislative package was being considered in Albany pointed out that the slowdown resulted in sharp job losses, decreasing billable assessed values, resulting in what the Giuliani Administration described as a 21 percent loss in property tax revenue from Downtown commercial properties. Office vacancy rates in Lower Manhattan had reached a post-World War II high and the Giuliani Administration claimed that unless the action was taken, the city’s economic recovery was at risk.

In her testimony, Deputy Mayor Reiter noted that the tax incentives for Lower Manhattan, the property tax abatement, and the commercial rent tax exemption, were designed to:

“...encourage private sector investment, stimulate the creation of new commercial development and provide tenants with lower occupancy costs and a high degree of certainty in regards to future costs associated with real estate taxes over the term of the lease.”

At the same time the CRP was aimed at subsidizing building upgrades and lowering the cost of occupancy to attract new tenants, two other components of the package, 421-g and the Energy Cost Savings Program, aimed to encourage conversion of older obsolete office towers to mixed and residential uses and stimulate economic activity in Lower Manhattan. Encouraging conversions would benefit other buildings by withdrawing

low-cost competitors from the market and also provide much needed housing. If conversions proved successful and the population of full-time residents in downtown grew, the city expected the area to begin attracting restaurants, personal services, and other amenities that would help transform Lower Manhattan into a more diversified, 24-hour community. The 421-g program was ended after 2006 and no new benefits have been granted since, but some buildings are still benefiting from previously granted exemptions. Over the course of the 421-g program, a total of 10 million square feet of old office space was withdrawn and converted to other uses, primarily residential. (Because the 421-g program has already ended, it was not included in this evaluation.)

2.2 Program Goals

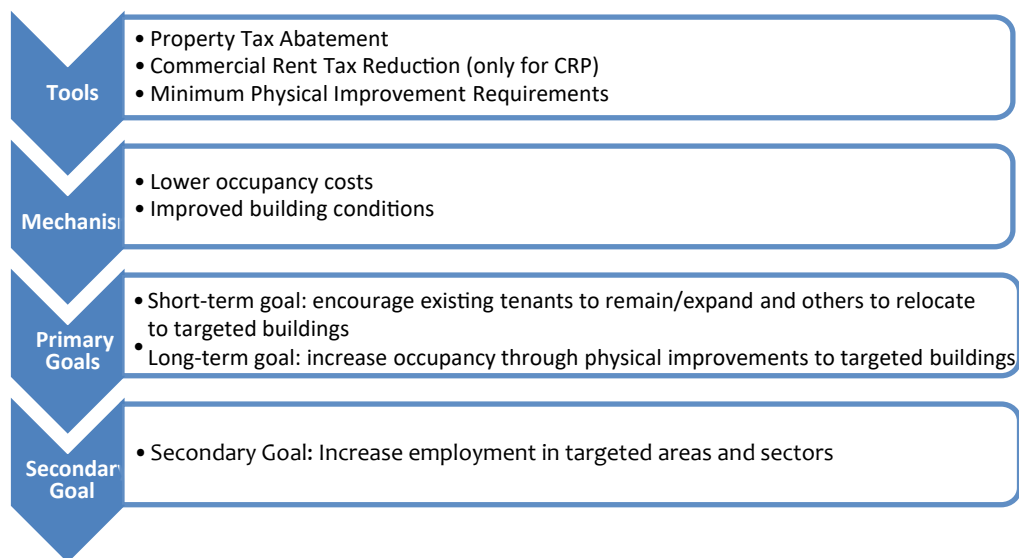
Well-defined and measurable goals are necessary for any program to deliver its intended outcomes efficiently. They enable the policy makers and program evaluators to determine whether the program is achieving its goals, how efficiently those goals are being met, and whether the program continues to be relevant over time. Therefore, it is considered best practice to articulate a program's goals as it is being established. In the case of tax expenditures, the program's goals should be clearly articulated in the law creating the benefit.

According to Local Law 18, IBO is to evaluate the effectiveness of the tax expenditure in achieving its goals. Ideally, the program goals will be defined in the legislation creating said tax expenditure, but in the absence of such a statement of goals, the local law provides for the City Council and IBO to collaborate in determining a set of goals to be used in evaluation. In the case of CRP, the 1995 legislation does not include language spelling out the intent of the tax expenditure. However, the memoranda in support of the legislation and transcripts of hearings in 1995, 2000, and 2005 give a general idea about the context and objectives of these programs. For example, in 2000, the State Senate's memorandum in support of the CEP program (Chapter 261 of Session Laws of 2000) reads "[t]he purpose of this Citywide Revitalization Plan is to expand the city's economic recovery and job creation by encouraging relocation and expansion of business to [the CEP eligible areas]." The city's memorandum in support identifies the purpose of CEP to be "economic recovery and job creation." "Based upon the availability of underutilized commercial and industrial structures these areas can be attractive alternatives for business activities or entities unable to carry Manhattan commercial rents, such as new technology start-up companies or back-office operations" (city's memorandum in support, New York State Senate, Bill Number S8219 of 2000). CEP was originally set to be temporary and expire in 2003.

By the time the 2005 legislation was being debated, the economy of Lower Manhattan was already in the midst of recovery. The Senate's memorandum in support of the 2005 legislation recognized this growth, but argued that additional incentives were needed and would benefit the city as a whole. "Rebuilding and revitalization [of World Trade Center and Lower Manhattan] are crucial to New York City's economy and in turn, will benefit the lives of all residents and New York City and New York State" (New York State Senate's memorandum in support of Bill Number S5805 of 2005).

Figure 2-2

Tools, Mechanisms, and Goals of the Commercial Revitalization Program and Commercial Expansion Program



SOURCES: IBO and New York City Council analysis of Commercial Revitalization Program/Commercial Expansion program structure and legal memoranda to New York State Senate

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IBO and the City Council used the objectives articulated at the 1995, 2000, and 2005 hearings and the design of the commercial revitalization and expansion programs as the starting point to define the programs' intent. Figure 2-2 summarizes the goals of the CRP and CEP and the mechanisms designed to achieve them. In the short term, these programs incentivize occupancy of older buildings by lowering the occupancy costs through property tax abatements and commercial rent tax reductions (the latter are only available for the CRP). Since program participants are required to make physical improvements to the building, future occupancy may also be incentivized through higher-quality buildings. Finally, if the program achieves higher occupancy rates, employment in the targeted areas and sectors may rise. Of course, the program may only increase employment in the target areas if commercial and retail tenants move from outside the areas, existing firms expand, or new firms are created in the area.

2.3 Program Benefits and Eligibility Requirements

2.3.1 Eligibility and Participation Requirements

Eligibility and participation requirements for CRP and CEP depend on the age and geographical location of the building, tenant's industry (for CEP), lease terms, and number of employees.

Since 1995, any nonresidential building in Lower Manhattan (the orange shaded area in Figure 2-3) that was built before 1975 is eligible to receive CRP benefits. Tenants and owners have to apply for the program together. To qualify for benefits, the applicants need to satisfy minimum lease terms and minimum physical improvement requirements that depend on the tenant's number of employees and whether the lease is new, or for a renewal or

Table 2-1
Commercial Revitalization Program Minimums
Physical Improvement Requirements

Lease Type	125 and Fewer Employees	More than 125 Employees
New	\$5.00 per sq. ft. of net leasable space	\$35.00 per sq. ft. of net leasable space
Renewal	\$5.00 per sq. ft. of net leasable space if previously occupied	\$10.00 per sq. ft. for all applicable net leasable space
Expansion	\$5.00 per sq. ft. of net leasable space	\$35.00 per sq. ft. of net leasable space

SOURCES: Department of Finance; New York State Real Property Tax Law § 499a-499h
 New York City Independent Budget Office

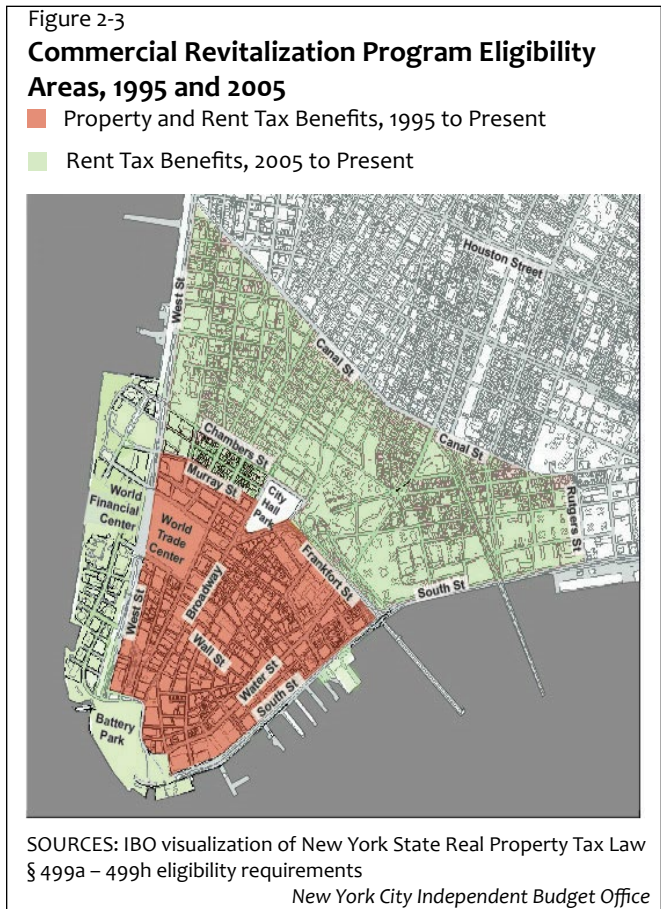
expansion. For small firms, defined as having 125 or fewer employees, the lease term must be at least three years. For large firms with more than 125 employees the lease must be at least 10 years. For small firms the minimum expenditure requirements under new and expansion leases are \$5 per square foot of net leasable space; for large firms the minimum investment is \$35 per square foot. Under renewal leases, these expenditure requirements for small and large firms are \$5 and \$10, respectively. Table 2-1 summarizes the expenditure requirements. The tenants and owners are free to negotiate the burden of these expenditures between themselves.

The CEP eligibility and participation requirements roughly parallel those governing CRP. The buildings need to be built before 1999, located in Manhattan north of 96th Street, the Special Garment District in Manhattan, or anywhere in the other boroughs. Unlike the Commercial Revitalization Program, hotels and retail establishments are not eligible for the CEP. The lease-term requirements for CEP are identical to those for CRP and while both programs require minimum physical improvements, the level of spending necessary under CEP is lower. CEP beneficiaries with fewer than 125 employees are only required to spend

\$2.50 per square foot of leasable space. Those with more than 125 employees need to spend \$25.00 per square foot under new and expansion leases and \$5.00 under renewal leases. In addition to these requirements, the total building area needs to be at least 25,000 square feet.³

For CEP, spending on improvements under new and expansion leases must occur within the three-year period prior to the start of the lease and up to 60 days after the tenant starts paying rent. Under a lease renewal, improvements must occur within the three-year period prior to the start of the renewal lease and up to 14 months after rent payments begin.

In 2005, the eligibility requirements for the commercial rent tax reduction portion of CRP benefits expanded to include more buildings. All nonresidential buildings south of Canal Street (shaded areas of Figure 2-3) and in the Special Garment District, regardless of when they were built, are now eligible for reductions in CRT. Garment district buildings also became eligible for property tax benefits under CEP. Regardless of whether newly eligible buildings receive both



property and commercial rent tax benefits or just the latter, they still need to adhere to the same lease terms and physical improvement requirements as other CRP beneficiaries.

2.3.2 Benefits

If a tenant qualifies for CRP or CEP, the owner's property tax bill is reduced and the law requires these benefits to be passed on to the tenant as a reduction in rent. Since the program participation, physical improvements, and rents are negotiated at the same time, this requirement may not be that effective. CRP recipients also receive commercial rent tax exemptions. The property tax benefits have remained the same over time, but the commercial rent tax benefits were increased in 2005.

Table 2-2 summarizes the CRP and CEP property tax benefits. The base amount of annual property tax abatement equals either property tax liability per square foot or \$2.50 per square foot, whichever is less. The abatement period, the number of years benefits are received, is three years for three- to five-year leases, five years for leases that are five or more years in CRP and commercial leases in CEP, and up to 10 years for manufacturing leases in CEP. Except for manufacturing leases under CEP, which do not have a phaseout period, the final two years of abatements are two-thirds and then one-third of the initial amount.

Before 2005, CRP beneficiaries also received three or five years of commercial rent tax reduction, which reduce the tenants' tax base. For year one, the reduction was equal to 100 percent of the rent. For later years, the base benefit was equal to the year one rent or the rent for the year in question, whichever was less. The benefits phased out in the last two years of the benefit period, by two-thirds and then one-third of the base amount. After 2005, tenants receive the base CRT benefits throughout the five years without any phase out of benefits. Garment district recipients are eligible for up to 10 years of commercial rent tax benefits.

Program	Lease Term	Abatement Period	Full Abatement Year	Year Before Final Year	Final Year
Commercial Revitalization Program and Commercial Expansion Program	3-5 years	3 years	Property tax liability or \$2.50 per sq. ft. whichever is less	2/3 of initial abatement	1/3 of initial abatement
Commercial Revitalization Program and Commercial Leases in Commercial Expansion Program	5 years or more	5 years	Property tax liability or \$2.50 per sq. ft. whichever is less	2/3 of initial abatement	1/3 of initial abatement
Manufacturing Leases in Commercial Expansion Program	5 years or more	Up to 10 years	Property tax liability or \$2.50 per sq. ft. whichever is less	Equal to initial abatement	Equal to initial abatement

SOURCES: Department of Finance; New York State Real Property Tax Law § 499a-499h

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3. Data and Methodology

After collecting, in some cases, digitizing, and merging various data sources to conduct this evaluation, this report relies on various methods for data cleaning and statistical analysis that are discussed in this section. The currently available data used for this evaluation come from CRP-CEP application files, which include the list of applicants and some of their characteristics, Cushman & Wakefield real estate reports, which include Manhattan office rents and vacancy rates, ES-202 data of the federal Bureau of Labor Statistics, which include employment by zip code and industry for New York City, and various other data sets that are collected to administer the city's property taxes. While these data are discussed in this section, data limitations are presented in section 7: Limitations and Recommendations for Future Evaluations.

Section 3.2 discusses the methods used for data cleaning followed by the empirical framework that may be used for identifying the causal effect of CRP and CEP on various policy outcomes like employment or vacancy rates. As section 3.2.1: Crosswalks: Geographical Unit of Analysis discusses, since the available employment and vacancy rate data were aggregated at different levels of geography, a spatial crosswalk was used to allocate these variables to the consistent geographical level that this study desires. Next, section 3.2.2: Measuring Eligibility and Participation Rates, discusses how CRP/CEP eligibility criteria were combined with building level data to estimate the number of eligible square feet of nonresidential space over time. Because the square footage of participating buildings is not available in the application data before 2010, this section further discusses how these number were imputed using the post-2010 data.

Finally, section 3.2.3: Empirical Methods discusses the treatment and control and empirical identification in simple terms. After discussing the appropriateness of various criteria to separate data points into treatment and control groups, the difference in differences strategy, is introduced as the method of choice to analyze the causal impact of CRP and CEP. As section 7.2 later discusses, due to some major data issues, this report does not present the analysis that uses the triple difference strategy. However, triple differencing is still discussed in the appendix because future evaluations may use this method.

3.1 Data

Various data sources and their characteristics are discussed below. These data sets include CRP-CEP application forms, Manhattan office rents and vacancy rates, New York City zip code by industry employment, and administrative property tax records. For a discussion of data limitations see section 7.

3.1.1 CRP-CEP Application Data

Landlords and tenants seeking benefits through CRP and CEP are required to file applications with the Department of Finance providing information about the parties to and terms of the lease, and the types and cost of improvements made. While DOF has an electronic database covering applications since 1995, for applications submitted up through 2010 the file contains only the most basic information. Beginning in 2010, DOF began recording more information about each application including the amount of expenditures on physical improvements, number of employees, location (Borough-Block-Lot [BBL]), application status, owner's name and representative, tenant's name and representative, type of business (office or manufacturing), square footage of leased space, and lease dates. Of these variables, the DOF database only includes lease dates, location, and application status before 2010. The DOF does have hard copies of application forms filed for 2005 through 2009, but application forms prior to 2005 were destroyed.

Section 3.2, on methodology, discusses how leased square footage can be imputed to mitigate some of these data limitations. However, any analysis of actual expenditures or number of employees of CRP-CEP participants is limited to years after 2010. This is clearly not ideal.

3.1.2 Office Rents and Vacancy Rates

Given the focus of CRP and CEP on reducing vacancy rates, it would be highly desirable to analyze building-level data. Such data would enable one to directly compare the CRP-eligible buildings with buildings that are not eligible. Although the Department of Finance currently requires building owners to submit data on building level vacancy rates to facilitate the property assessment process, IBO does not currently have access to these records whether included in Real Property Income and Expense (RPIE) or Tax Commission Income and Expense (TCIE) filings. IBO has requested access to RPIE data that contains information on vacancies in individual buildings, but Section 11-208-1 of the Administrative Code prohibits release of individual RPIE data to outside analysts and researchers.

To deal with the lack of building-level data, IBO collected and digitized a long time series of aggregate office rents and vacancy rates data for Manhattan, south of 63rd Street. These data are taken from the Cushman & Wakefield (CW) fourth-quarter Manhattan office reports, published under various names from 1984 through 2017. Although in some instances, these reports provide summarized data for different building vintages, the majority of the reports only include office rents and vacancy rates summarized for different segments of the Manhattan office market as defined by Cushman & Wakefield; the boundaries of these submarkets have shifted over time. Unfortunately, Cushman & Wakefield's definition of Lower Manhattan does not line up with the area eligible for the Commercial Revitalization Program. Section 3.2.1 discusses the methodology IBO used to estimate office rents and vacancy rates in the areas eligible to receive CRP and CEP benefits over time.

3.1.3 Employment Data

This report uses data on industry employment aggregated by zip code to analyze the relationship between CRP and CEP programs and employment. These data are from the Covered Employment and Wages Program, commonly referred to as the ES-202 program. The program produces a comprehensive tabulation of employment and wage information for workers covered by state unemployment insurance laws and federal workers covered by the Unemployment Compensation for Federal Employees program. Publicly available files, reported by the Bureau of Labor Statistics, include data on the number of establishments, monthly employment, and quarterly wages by detailed industry codes, by county, and by public or private sector, for the entire United States.

IBO has acquired a special tabulation of these data by New York City zip codes and industry. From 1989 through 2000, the data are reported at the two-digit Standard Industrial Classification (SIC) level. After 2000, two-digit SIC codes are replaced with three-digit North American Industry Classification System (NAICS) industry codes. The methodology section discusses how IBO used a geographic cross-walk to estimate employment for the area eligible for Commercial Revitalization Program benefits. Similarly, an employment based crosswalk between two-digit SIC codes and three-digit NAICS codes was used to classify industries on a consistent basis over time.

3.1.4 Administrative Property Tax Data

The Real Property Assessment Division (RPAD) of the Department of Finance collects building-level data to administer the assessment and collection of property taxes. The RPAD data set can be used to estimate the gross square footage of CRP- and CEP-eligible buildings based on building class, age, and location over time. Furthermore, this data set includes property assessors' annual measurements of changes in the value of the land and buildings due to market changes (equalization) and physical changes (construction, improvements, demolition, etc.) This study also uses detailed records of property tax exemptions, tax class, and final assessments that are included in RPAD files.

Given that detailed investment data is only available for CRP and CEP applications since 2010, we had hoped to use the physical change data in the RPAD files as a substitute measure for investment in earlier years of the program. As it will be discussed in detail below, we found little correlation between the two data sets for the years (2010-2015) that they overlap. The challenge this posed to our analysis is discussed in the results section.

Absent direct measures of quality of buildings in any data set, this study also explores whether program participation is reflected in rental income. In New York City, owners' rental incomes are reported in two data sets: Real Property Income and Expense and Tax Commission Income and Expense statements. While the former include data on all commercial and rental buildings with assessed value exceeding \$40,000, IBO does not currently have access to these records. The TCIE income and expense data is available

to IBO, but this only includes data for buildings whose owners disputed their property tax assessments. Therefore, rental income in this data set is only available for a nonrandom sample of all buildings.

3.2 Methodology

The methodology IBO used to evaluate the CRP-CEP programs was largely dictated by the available data. As discussed earlier, these data come in various forms. Section 3.2.1 first discusses how data on office vacancies and rents (which are aggregated by rental market areas) and employment data (aggregated by zip code) are combined using allocation factors. Varying industry classification systems are also discussed. Next, section 3.2.2 examines how we addressed data cleaning and missing values to generate program eligibility and participation rates. Finally, regression analysis techniques are briefly discussed in section 3.2.3, including empirical identification using difference in differences strategy.

3.2.1 Crosswalks: Geographical Unit of Analysis

In order to study the impact of the Commercial Revitalization Program, it is necessary to measure employment, rents, and vacancy rates within the same geographic areas. However, the data sets used in this evaluation are summarized by geographic areas that vary in size and do not align with the borders for CRP eligibility. Employment data are summarized by zip code, while rents and vacancy rates are reported by Cushman & Wakefield for various—and occasionally shifting—segments of the Manhattan office market. As shown, there are zip codes and Cushman & Wakefield submarkets that partly overlap the areas eligible for CRP. Furthermore, we can see that CW submarkets do not align with zip codes. Therefore, the available data cannot be readily used to compare employment and office rents for similar areas. To estimate these statistics at our desired level of geography, we calculate allocation factors (Afacts) to form crosswalks between Manhattan zip codes, CW submarkets, and our target areas (discussed below).

In a data crosswalk, the Afacts determine what share of each source-geography area should be allocated to each target-geography area. For example, Cushman & Wakefield defines the Chelsea office submarket as an area that covers parts of zip codes 10001 and 10011. We know employment levels for each of those zip codes. To estimate total employment in Chelsea, however, we need to know what share of employment in each of these zip codes belongs to the Chelsea office market. That is, we need to know the Afacts for a crosswalk from zip codes to CW areas. In this case, a reasonable way of calculating Afacts is to estimate what portion of total commercial square footage in each zip code belongs to Chelsea, because we know that the employment for participants in the CRP and CEP programs would be located in commercial buildings. Since we know the commercial square footage of each tax lot, we estimate that 35 percent of employment in zip code 10001 and 68 percent of employment in zip code 10011 together make up total employment in the Chelsea submarket.⁴

A crucial objective of the evaluation is to compare the areas that are

eligible for CRP with those that are not. Because these areas have different characteristics, we would like to study the smallest possible area to control for characteristics (variables) that can vary from area to area. At the same time, the target areas for our allocations are designed to coincide with the CRP eligibility areas. Although if we want to study employment and office rents and vacancy with the same controls and area design, our smallest possible area is dictated by CW submarkets, which are typically larger than zip codes. Figure 3-2 shows how the study's target areas were designed around the CRP-eligible areas in Downtown Manhattan. For example, the western parts of the CW World Trade/World Financial (WT/WF) Center office submarket are not eligible for CRP, and the northern part is only eligible for CRP after 2005. The target area WT/WF only includes eligible areas with the addition of some parts of CW's City Hall submarket area. The ineligible areas are assigned to WT/WF-NE, where NE stands for Not Eligible. Our target areas in Midtown area match CW areas.⁵

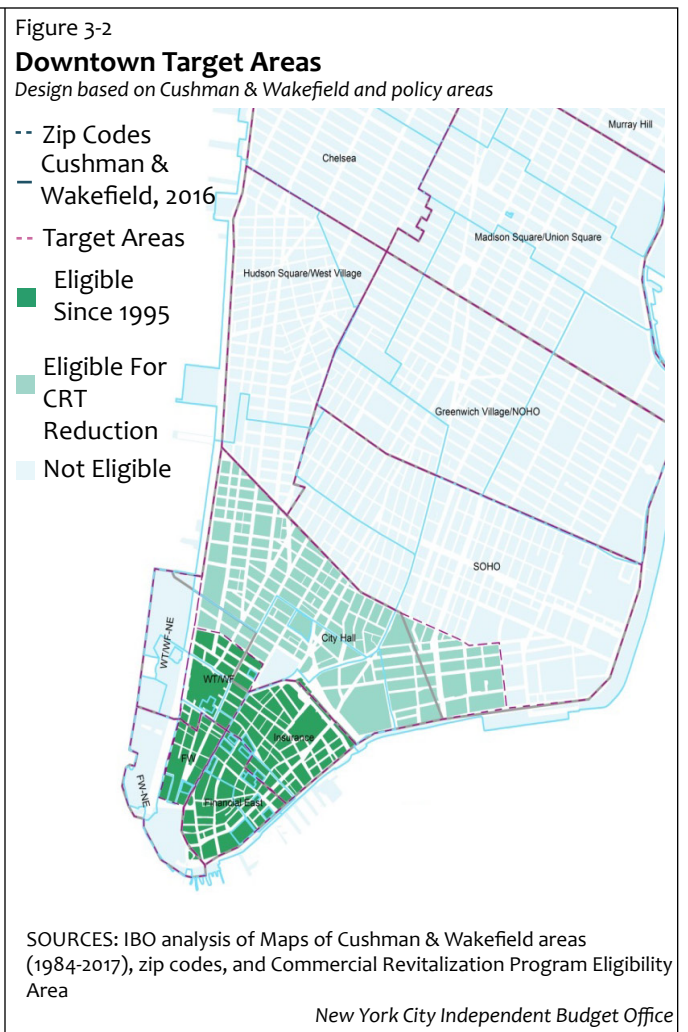
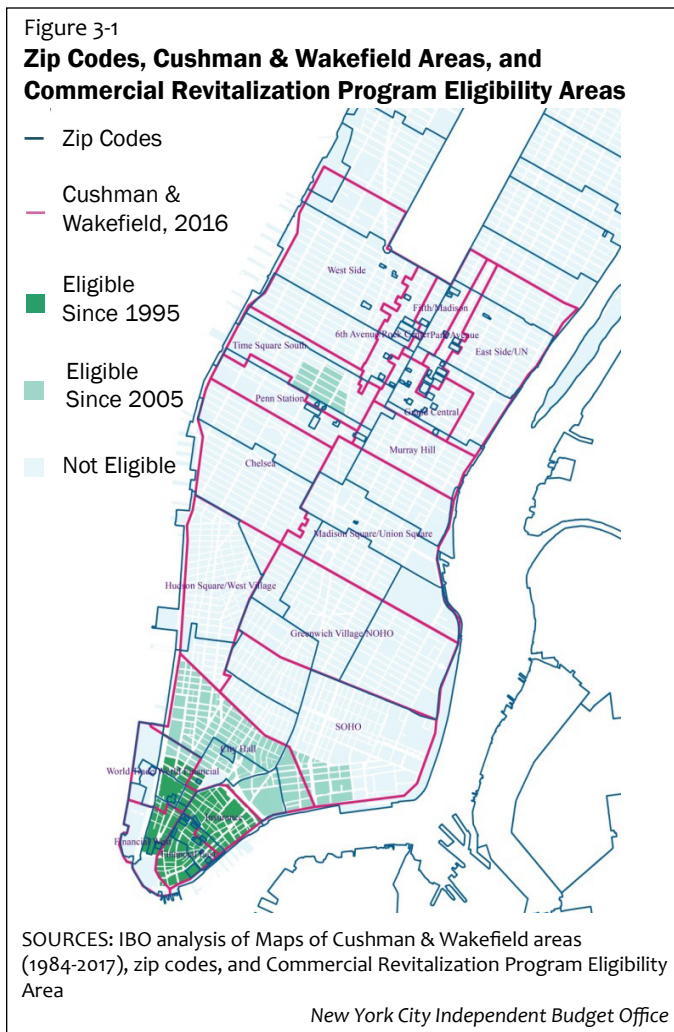
3.2.2 Measuring Eligibility and Participation Rates

IBO measures program participation rates as total square feet of leased space enrolled in the program divided by total square feet of eligible space. Because we do not have data on square feet of space leased by program participants before 2010, we impute the share of eligible building space participating in the program pre-2010 using the average post-2010 share for similar buildings. Similar buildings are characterized through total building square footage, number of units in the building, a condominium indicator, a pre-1975 year built indicator, and borough. Finally, the leased square footage is estimated by multiplying the single-mean imputed square footage share by actual building square footage. In single-mean imputation, the regression of one variable on observables is used to impute the missing variable using the regression forecast.

One may use the length of the tax abatement to determine whether a CRP/CEP participant is still enrolled in the program in a given year. Because data on the length of abatements was not recorded prior to 2010, we instead used the minimum lease lengths required under each of the programs. Since the pre-2010 data does not distinguish commercial leases from manufacturing leases eligible for longer abatements, we assume all pre-2010 leases are commercial. Therefore, all such abatements are capped at five years.

Finally, to estimate building-level enrollment, total square footage of enrolled units is aggregated at the building level. At this stage, enrollment share of each building is also calculated as a measure of “intensity of treatment”—a concept discussed later in the empirical methods.

Property tax administrative records are used to determine eligible buildings and their square footage. After overlaying the map of eligible areas (as defined by the law) with the map of borough-block-lots, building class, tax class, gross square footage, and year built are used to determine CRP and CEP eligibility.⁶ In many instances, especially for condo units, year built and square footage data have not been updated in the administrative data; in other cases, year-to-year square footage changes consistent with new



construction can be observed in the administrative property data without any updates to year built. In these cases, a combination of data from previous years and pre-apportionment (i.e. before a building was split into condo lots) data were used to impute these variables.

3.2.3 Empirical Methods

In designing an evaluation of the causal impact of a program, it is useful to ask “what is the ideal experiment?” If the goal is to study whether an intervention such as the CRP program is effective for older buildings, we can define our study sample as all the nonresidential buildings built before 1975 in Lower Manhattan. In the ideal experiment, where building-level effects are of interest, half of these buildings would be randomly given access to the CRP. Call this group the “treatment group” and the buildings that did not receive access to the CRP the “control group.” The difference in the vacancy rates of the “treatment” and “control” groups would be attributed to the causal effect of the CRP on vacancy rates. Similarly, when neighborhood effects are of interest, the ideal experiment would only “treat” a random subsample of the neighborhoods. For evaluation of CRP and CEP, such an ideal but impractical experiment is only useful as a guideline.

When random assignment is not possible, a quasi-experiment is used to estimate the causal impact of an intervention. Instead of randomized controlled trials, quasi-experimental designs typically allow the researcher to control the assignment to the treatment condition by using some criterion such as a cutoff for eligibility. For such a study to be valid, the control and treatment groups need to be comparable before the intervention, also known as the baseline.

To find a good control group for the treated buildings, suppose that we have data on all of the eligibility cut-offs for the CRP and the CEP listed below.

- Time: the policy changed several times: 1995 and 2005 for the CRP and 2000 for the CEP
- Geography: boundaries for eligibility
- Vintage: year built criteria
- Firm size: number of employees
- Building/Lease Use: “office & industrial” or “commercial & retail”
- Rent/Space: Leases with rents below \$500,000 are exempt from commercial rent tax beginning in 2018, a cut-off that has been raised repeatedly. The original \$50,000 cut-off for the exemption was raised to \$100,000 in 1998, \$150,000 in 2000, and \$250,000 in 2002. Also, CEP participants need to have at least 25,000 square feet in the building.

From the perspective of program participants, timing of policy changes, location of the building, and building vintage are fixed. Conversely, firm size, how the space is used, and the rent and square footage of leased space are subject to change. Given that the latter criteria can themselves respond to the policy, they are not ideal eligibility cut-off candidates for a causal study.

It is important to test if the control and treatment groups are comparable at the baseline. For example, it is possible to see if the control and treatment groups had similar characteristics, outcomes, or followed similar trends before the program start date. Since being closer to the cut-offs means that the observations are more similar, it would be ideal to limit the analysis to observations that are as close as possible to each cut-off. However, there is always a tradeoff between this choice and the number of observations that are available for analysis. For example, the buildings built in 1974-1975, which are close to the 1975 vintage cut-off, are probably more similar to those built in 1975-1976 than those built in 1976-2017. There may only be a couple of buildings built between 1974 and 1976, however, and such a small sample size leads to unreliable estimates. Therefore, the evaluator needs to make a choice about the cut-offs to use and the closeness to each cut-off.

Analysts frequently use a difference in differences method to estimate the effect of a treatment on an outcome. This method compares the average change over time in the outcome variable for the treatment group with the average change over time for the control group. Therefore, any changes that are the result of factors that affect both the treatment and control groups are not incorrectly associated with the causal effect of the treatment. See Appendix II for a description of this methodology and triple differencing strategy. Although some of our data sets allowed for using

a triple-difference strategy, we discovered major data quality issues that rendered this approach untenable.

4. Evaluation Results

This section discusses the characteristics of program participants, the participation rates, and the effect of CRP and CEP on office vacancy rates, employment, spending on physical improvements, and property tax revenues. The CRP participation rate has been at most 22 percent and professional, scientific, and technical services make up the dominate share of participants. On the other hand, participation rates in CEP and CRT-only part of CRP have been less than 2 percent. Manufacturing and wholesale trade industries have often made up a large share of the CEP participants, but not every year.

Sections 4.2 and 4.3 show that CRP did not have a statistically significant effect on either neighborhood office vacancy rates or employment. This result is presented using a conceptual example, graphically, and in a difference in difference method. Each of these sections compares the outcomes of the CRP or CEP area with those of a control group—typically the Midtown area—and show that Downtown followed the same market trend as the control group. Given the very low participation rates in CEP, there is no expectation of large neighborhood effects for this program. However, it is shown that CEP areas also followed the same employment trends as Midtown.

This section also evaluates whether CRP and CEP induced physical improvements that are beyond the typical amounts for a new lease and whether these physical improvements affect the property tax base. Given that 62 percent of participants spend more than double the minimum amount required on physical improvements, it is likely that most of the participants would have spent much more than the minimum requirements even without CRP participation. This result is less pronounced for CEP (see section 4.4).

Section 4.4 also shows that on average only 29 percent of the CRP and CEP physical improvements (as reported on the participants' certificate of physical improvements) are captured in the property tax records.

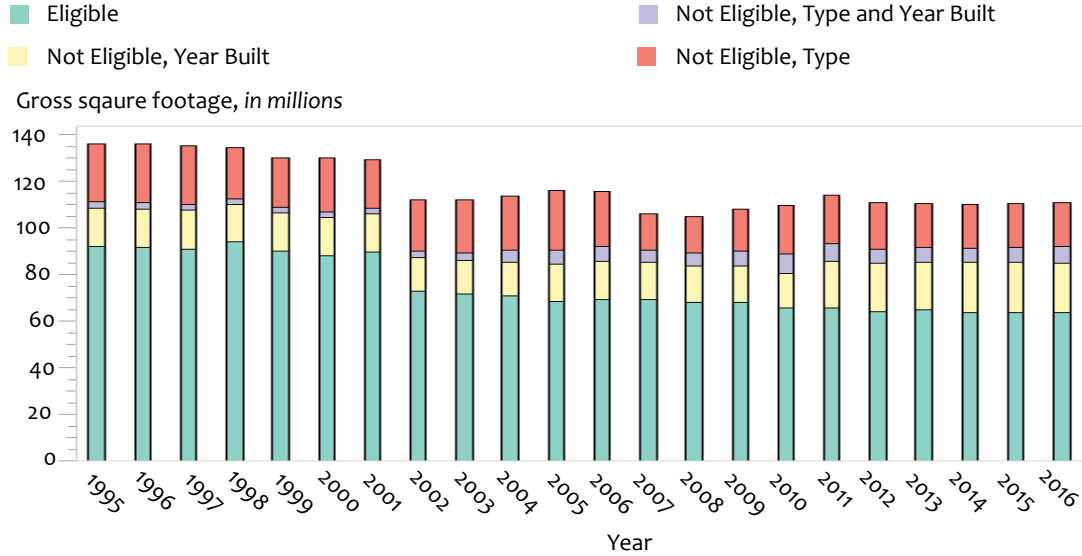
4.1 Eligible Buildings and Participation Rate

Who are the CRP and CEP effectively subsidizing and how attractive are these programs? Are there any reasons for the programs to be redesigned? Characteristics of the eligible buildings and participation rates shed some light on these issues. This section describes the eligible and participating buildings through the lens of total square footage, building class, location, age, and industry.

In 1995, 68 percent of the Downtown buildings were eligible for the property tax abatements under CRP compared with 57 percent in 2016. Total square

Figure 4-1

Gross Square Footage of Commercial Revitalization Program-Eligible Area Buildings by Commercial Revitalization Program Eligibility

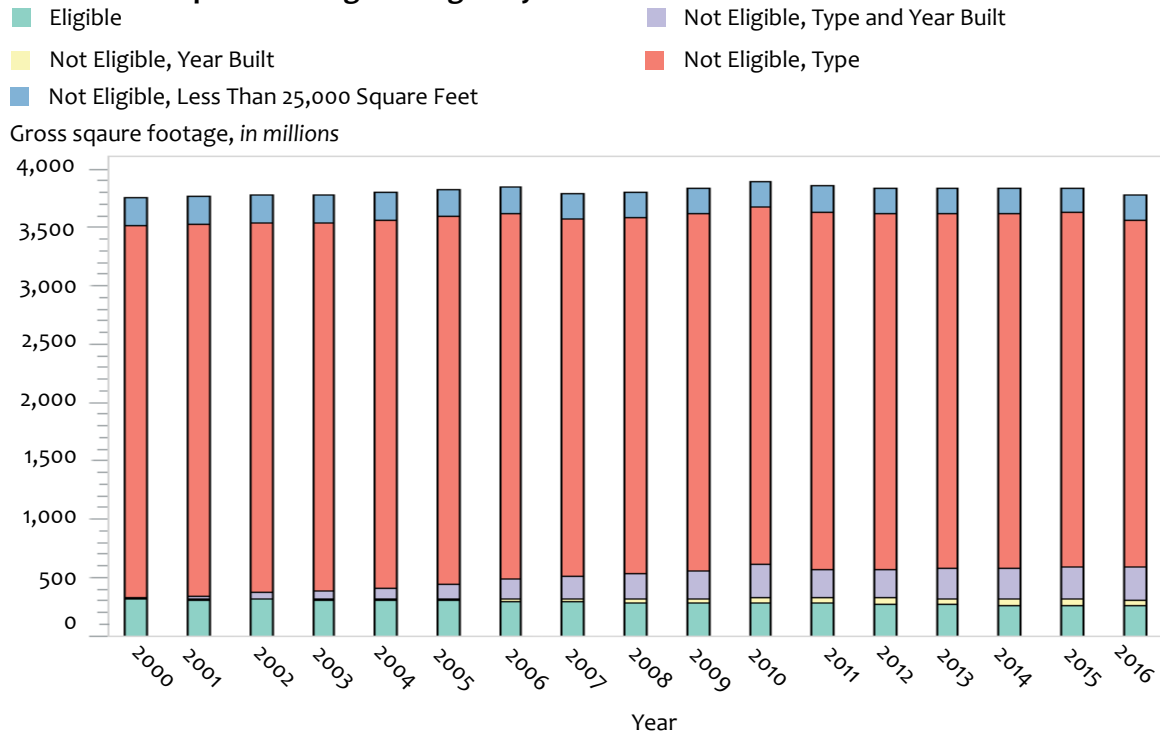


SOURCE: IBO analysis of Department of Finance property tax data

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Figure 4-2

Gross Square Footage of Commercial Expansion Program-Eligible Area Buildings by Commercial Expansion Program Eligibility



SOURCE: IBO analysis of Department of Finance property tax data

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footage of Downtown buildings color coded by their eligibility for the CRP program is shown in Figure 4-1. A significant drop occurred in 2001 due to the destruction of the World Trade Center buildings, which had been eligible for CRP. In the figure, ineligible buildings are coded to indicate whether the lack of eligibility was due to age, building type, or both. Most of the buildings that were ineligible in 2016 were built after 1975. Only 28 percent of the ineligible buildings in 2016 didn't qualify because of their type (residential).

Shifting focus from Lower Manhattan and the CRP to CEP and New York City as a whole, the share of CEP-eligible buildings decreased from 15 percent (585 million square feet) in 2000 to 12 percent (491 million square feet) in 2016. Over time, many of the older nonresidential buildings have been replaced by newer buildings, in many cases new residential buildings. Figure 4-2 shows square footage of eligible and ineligible buildings in the area covered by CEP. The category and axes labels are similar to Figure 4-1 described above.

However, a large proportion of the buildings is not eligible for CEP because of the requirement that buildings be a minimum of 25,000 square feet. As would be expected, the outer boroughs are much more residential than commercial.

Figure 4-3 shows the participation rates for each of the programs. The participation rate for the 1995 version of the CRP program is much higher than for CEP, and peaks in 2009 at 21 percent. The CEP and the post-2005 (CRT only) CRP have had much lower participation rates—1.8 percent and 1.9 percent at their peaks, respectively.

There are a few likely explanations for the lower CEP participation rates. First is the amount of property taxes involved. Buildings in the areas eligible for CEP (mainly outer boroughs) often pay less than \$2.50 per square foot while buildings eligible for CRP (located in Lower Manhattan) almost always pay more. Therefore, the property tax abatements, being the smaller of property taxes and \$2.50, are usually lower in absolute terms for recipients of CEP as compared with recipients of CRP. That said, as a percentage of property taxes and tenants' rents, the abatements will almost always be higher for the

CEP participants. Second, we should note that the CEP-eligible buildings are newer and may need at most modest physical improvements. When CEP was established in 2000, buildings completed as recently as 1999 were eligible. On the other hand, when the CRP was established in 1995, the newest eligible buildings were 20 years old. Finally, the buildings eligible for the CRP are in a concentrated area with many different business incentives and organizations that promote them. Brokers working in the Downtown market are familiar with CRP and the other available programs and can

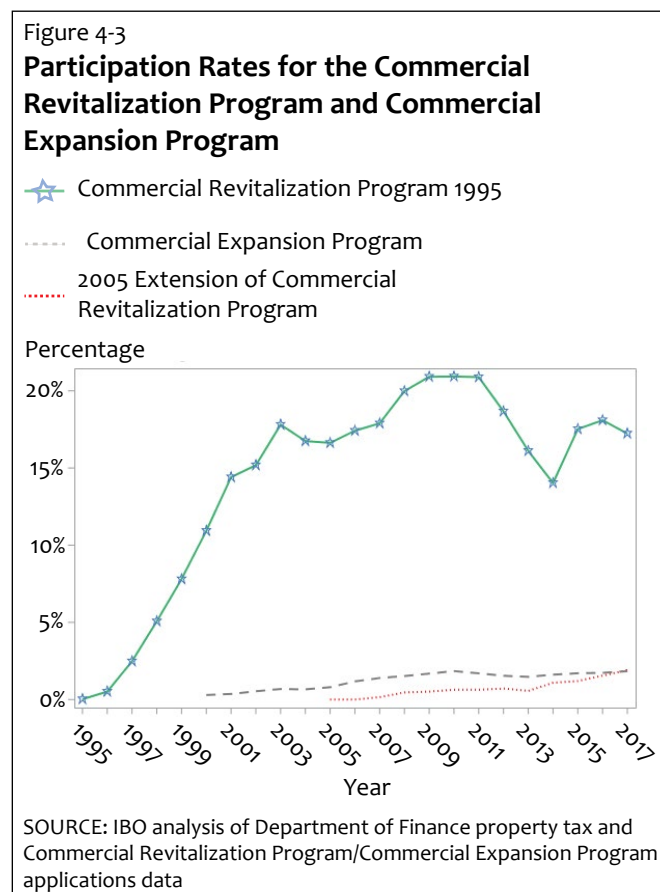
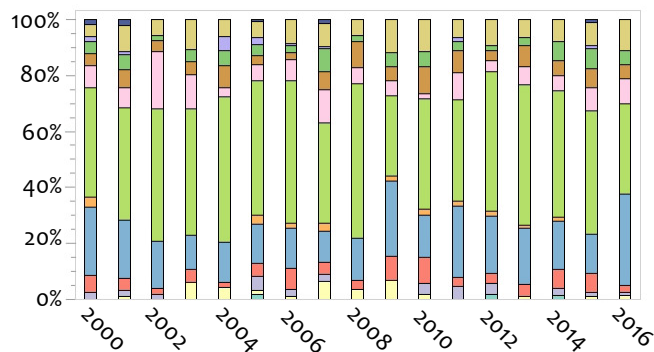


Figure 4-4

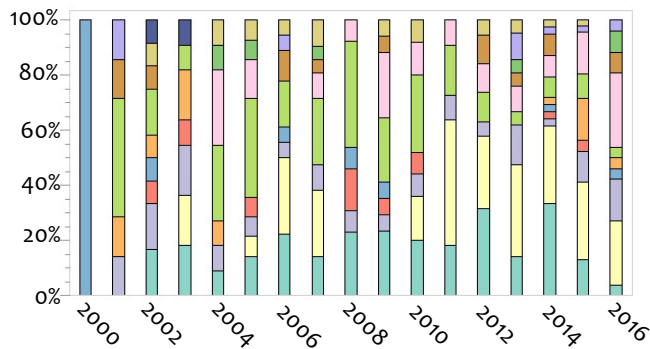
Industry Mix of Program Participants



Commercial Revitalization Program



Commercial Expansion Program



SOURCE: IBO analysis of Commercial Revitalization Program/Commercial Expansion Program and Quarterly Census of Employment and Wages data

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help guide prospective tenants in accessing benefits. There is also support provided by the Downtown Alliance, which works to promote the area. The financial and professional firms in Lower Manhattan are also more likely to have experience working with lawyers to secure benefits available under city programs. The DOF application data shows that many CRP applicants are represented by the same legal services firms.

Another factor likely holding down participation in the post-2005 expansion zone for CRP (Murray/Frankfort to Canal) is that the benefits available in the expansion zone are less generous. Participants still need to make the same physical improvements as in the rest of the CRP area, but they are only eligible for the “special reduction” in the commercial rent tax, which does not apply to annual rents below \$250,000.⁷ It is noteworthy that in spite of this, the participation rates have been steadily growing (see Appendix Figure 3-1 for a closer look).

While participation rates are indicative of the attractiveness and ease of access to these programs, building class and industry of the tenants shed some light on who is effectively subsidized by these programs. Figure 4-4 shows the percentage of the CRP and CEP participants in different industries. Almost all of the CRP participants occupy office buildings, while CEP participants are in industrial and factory buildings (41 percent), warehouses (28 percent), office buildings (23 percent), or lofts (6 percent). Increases in CEP participation are almost fully owed to more participants in factories and industrial buildings (see Appendix Figures 3-3 and 3-4).

For the years 2000 through 2016, IBO was able to identify the industry of about 75 percent of CRP and CEP participants using data from the Quarterly Census of Employment and Wages coupled with employer identification numbers for specific firms. Professional, scientific, and technical services comprise the largest share of CRP participants. Participants in finance and insurance industry comprise the second largest group. CEP participants, on the other hand, include a large number of manufacturing and wholesale trade firms. Also, note that as the CEP covers a larger and more diverse area, the industry mix of the participants has varied a lot more over time than among the CRP participants.

4.2 Office Vacancy Rates and Rents

In the first half of the 1990s, Lower Manhattan experienced high office vacancy rates in excess of 20 percent. From year-end of 1995 to year-end of 1998 the office vacancy rate sharply dropped from 20.2 percent to 9.2 percent. Finally, in 2000, the office vacancy rates were only 3.6 percent—much lower than its historical average of 12.4 percent. In this section, we examine whether it was the 1995 Commercial Revitalization Program that reduced vacancy rates in Lower Manhattan or whether the rate would have dropped anyway.

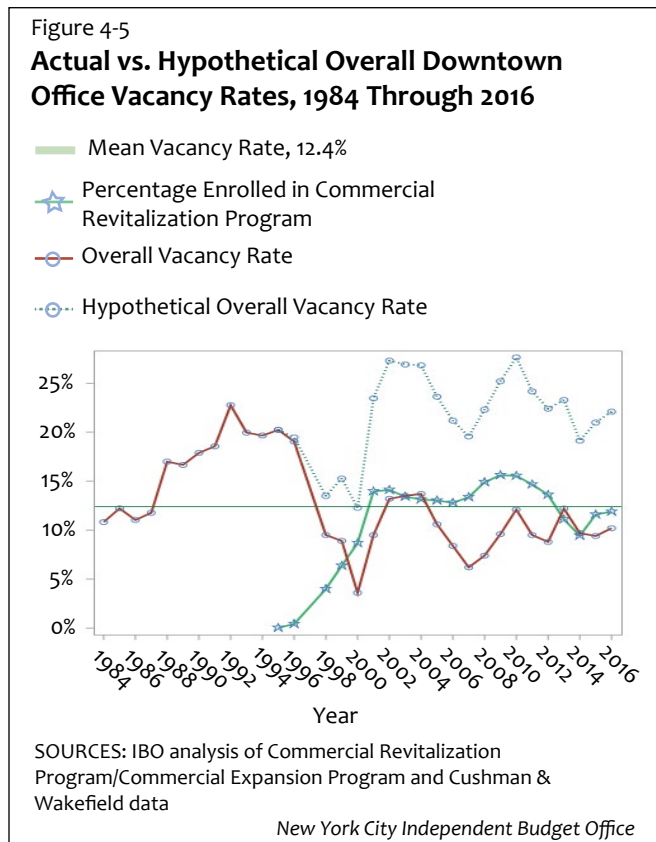
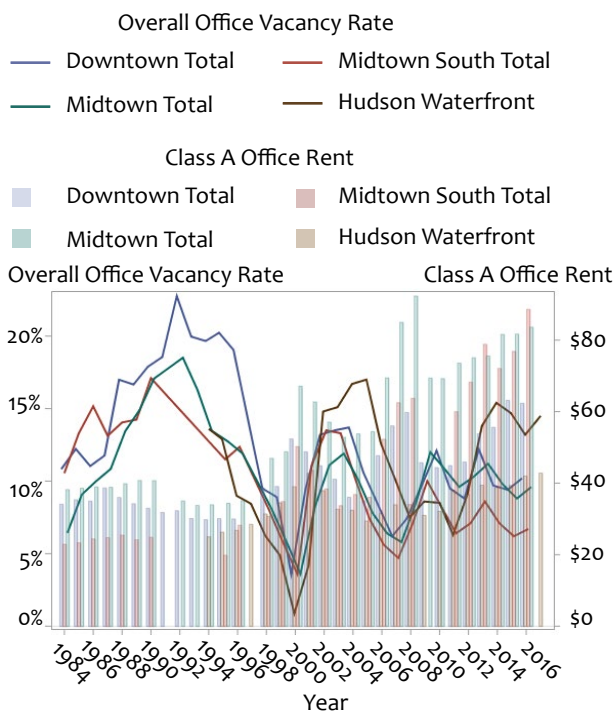


Figure 4-5 shows that even after making the best case scenario assumption for the effectiveness of CRP, vacancy rates in Downtown would have dropped anyway. We began by making the very strong assumption that all of the square footage occupied by the CRP participants would have remained vacant without CRP. The dotted blue line in this figure shows the hypothetical Lower Manhattan vacancy rates under this assumption. The hypothetical vacancy rates are basically the sum of actual vacancy rates and the percentage of the space occupied by CRP participants. We can observe that from 1995 through 2000, even the hypothetical vacancy rates drop from 20.2 percent to 12.4 percent. Even under the most unrealistic assumption, without CRP vacancy rates would have still dropped by 8 percentage points in this period. The hypothetical exercise in Figure 4-5 only suggests that CRP was not responsible for all the vacancy rate improvement. Was CRP responsible for any of the improvement in Downtown office vacancy rates in the late 1990s?

Comparing office vacancy rates of different areas over time, in Figures 4-6 and 4-7 we see that Downtown rates seem to be simply following the market trend. We used Midtown Manhattan office buildings as the control group because the Midtown area did not have a CRP program to mitigate its high office vacancy rates in the early 1990s. As the line graphs of Figure 4-6 show, just like

Figure 4-6

Office Rents and Vacancy Rates in Different Areas



SOURCE: IBO analysis of Cushman & Wakefield data
 NOTE: Lines show office vacancy rates and bars show office rents.

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Downtown, Midtown vacancy rates peaked in 1992 and then declined sharply for the rest of 1990s. The vacancy rates in Midtown South and even in the Hudson waterfront area of New Jersey seem to follow the same general trends. Also, as one would expect, rental rates move in the opposite direction as vacancy rates, rising when vacancy rates are falling and vice versa.

Note that vacancy rates are different across different areas. For example, the 1992 office vacancy rate in Lower Manhattan was 22.7 percent while that of Midtown was 18.5 percent. This is not unexpected. One reason is because the building stock differs between the two areas. In 1995, the share of Downtown office space in Class B buildings was 35 percent compared with 18 percent for Midtown.⁸ Given that Class B buildings are generally older and of poorer quality, their vacancy rates are higher than Class A buildings. At the same time, Midtown buildings may be in a more desirable location for office buildings, possibly due to the area’s proximity to the Upper East/West Side and easier commute to the suburbs to the north and east of New York City. However, they follow the same market trends as higher quality buildings.

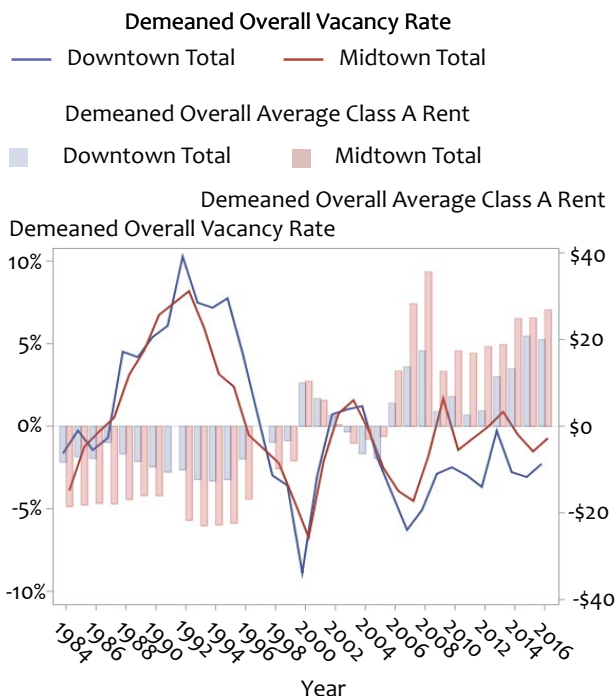
To test if the availability of CRP in 1995 caused any vacancy rate movements off the trend, we subtract the neighborhood averages from the data to compare the demeaned rents and vacancy rates of Downtown and Midtown over time in Figure 4-8. The vacancy rates in both areas follow the same trends. In other words, no off-the-trend movements appear to exist for Downtown before and after 1995 when CRP came into effect.

4.2.1 Quantifying the Figures

It is fairly straightforward to quantify the office vacancy rate effects discussed above using a difference in differences regression analysis shown by the equation below and we find the same results that CRP was not responsible for reducing Downtown office vacancy rates. Given the limited data available from the 1980s and 1990s, we only have one area in the treated group and one in the control group. Because we have multiple years of data before and after 1995, however, statistical inference is possible. Since any effect associated with CRP would show up closer to its start in 1995, we limit the sample years to 1984-2000. As discussed in section 3.2.3, this time period has been chosen carefully. By 2000, the CRP participation rate was already above 15 percent, which is large enough to have an effect on the market. If we expand the years beyond 2000, however, we are likely to capture the effect of economic events, natural disasters, or other programs.

Figure 4-7

Demeaned Office Rents and Vacancy Rates of Downtown and Midtown Manhattan, 1984 Through 2006



SOURCE: IBO analysis of Cushman & Wakefield data
 NOTE: Lines show office vacancy rates and bars show office rents.
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Equation 1

Difference in Differences Estimates for Vacancy Rates

$$Y_{it} = \alpha + \beta DT_j + \lambda_{dt} + \delta(DT_j \times d_t) + \epsilon_{it}$$

- Y is the Vacancy Rate for region j at time t
- DT is a dummy variable which is equal to 1 if the observation is from Downtown
- d is a dummy which is equal to 1 if the observation is post-1995

The first three estimated coefficients in column 3 of Table 4-1 respectively show that in the pre-1995 time period in Midtown the average vacancy rate was 13.4 percent, Downtown vacancy rates were on average 2.8 percent higher, and after 1995 vacancy rates were on average 6.3 percent lower. Although the coefficient on the interaction term “Post-95 x Downtown” indicates that downtown vacancy rates were 1.1 percent *higher* after considering the market trends of Midtown, this estimate is not statistically significant. Taken at face value, the point estimate of the effect of CRP is not economically meaningful either; relative to the 17 percent drop in Downtown vacancy rates from 1995 through 2000, a difference of 1.1 percent is very small. In short, CRP had virtually no impact on office vacancy rates Downtown. Similar results for average Class A office rents are shown in column 2. The point estimates for rent effects is \$0.33, this is not statistically significant. The standard error of this estimate is \$4.87. Even when the regressions are run for smaller geographical areas and controlling for fixed effects, the introduction of CRP in 1995 did not have a statistically significant effect on either office rents or vacancy rates.

4.3 Employment

The CRP and CEP programs are not specifically designed for job creation or relocation of firms from outside New York City. The benefits are granted for occupancy and renovation, no matter how many employees you have. In fact, these programs provide hiring disincentives to firms with just below 125 employees. This is because, for the same amount of benefits, an employer with more than 125 employees is required to spend seven or ten times (for CRP and CEP, respectively) more in physical improvement expenditures than one with less than 125. Nevertheless, these programs provide the businesses with subsidies

Table 4-1

Difference in Differences Regression Estimates for Vacancy Rates

Column 1	Column 2 Average Rent (Class A)	Column 3 Overall Vacancy Rate
Intercept	31.8600*** (-1.7359)	0.1340*** (-0.0074)
Downtown	1.8127 (-1.9097)	0.0281* (-0.0145)
Post-95	5.4189 (-3.6763)	-0.0628*** (-0.012)
Post-95 x Downtown	0.3346 (-4.8785)	0.0112 (-0.0313)

SOURCES: IBO analysis of Cushman & Wakefield data
 NOTES: Sample: Fourth quarter overall vacancy rate and rents of 1984-2000 (third quarter for 1996) for Downtown and Midtown, Midtown South. Both regressions control for third quarter effect. The numbers in parenthesis are standard deviations and *s indicate statistical significance. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.

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that may induce creation of new jobs.

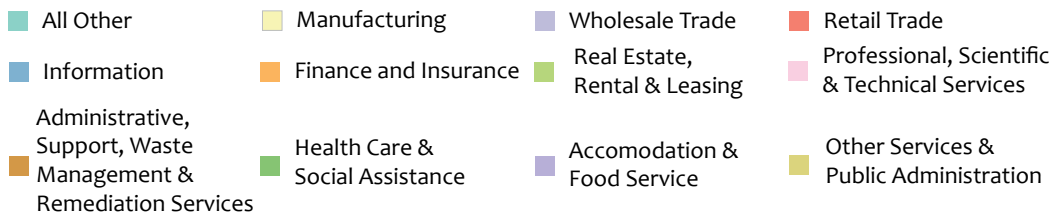
The CRP and CEP programs may either add new employers in the eligible buildings or stop existing employers from leaving. It is useful to consider the effect of these programs on employment in the following framework:

1. How many of the jobs in the eligible buildings are a direct result of these programs?
 - a. Where would these jobs have been otherwise?
 - i. Never created or eliminated jobs?
 - ii. Outside New York City?
 - iii. In New York City, or even in the eligible areas?
2. How many other jobs were created as an indirect consequence of these programs?
3. Who is holding those jobs? Residents of New York City or residents of other areas?

To fully answer the first two questions requires accurate data on the addresses of firms over time. To address the third question also requires data on where the firms' employees reside. Since IBO is not currently in possession of such data, this section analyzes employment data by zip code and industry to shed light on composition and general trends of employment

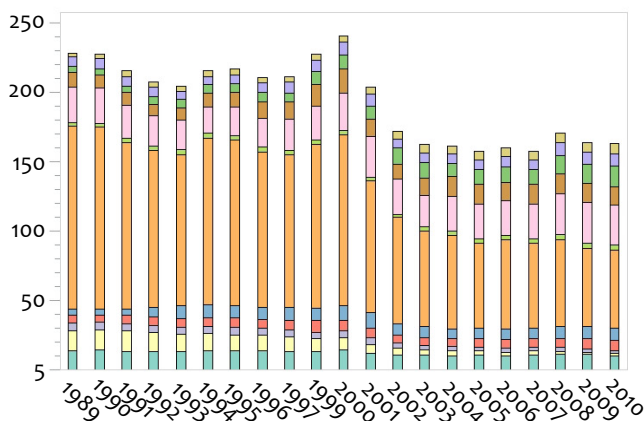
Figure 4-8

Employment Trends in Manhattan by Commercial Revitalization Program Eligibility Area, 1989 Through 2010



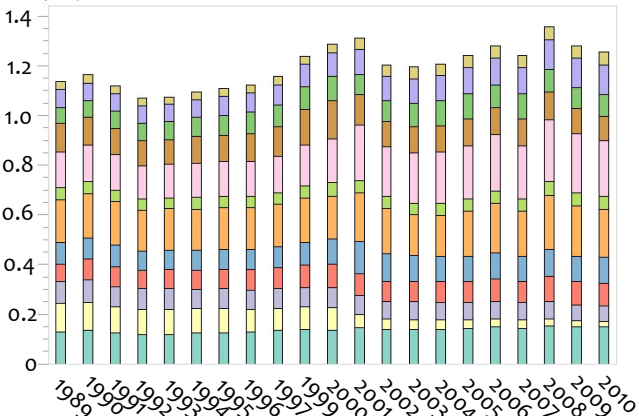
Employment Trends in Commercial Revitalization Program Area

Employment, in thousands



Employment Trends in Other Commercial Areas in Manhattan

Employment, in millions



SOURCE: Independent Budget Office analysis of ES-202 zip code by industry data
 NOTE: 1998 is excluded due to corrupt data.

in CRP- and CEP-eligible areas in comparison with the rest of Manhattan. Such analysis does not allow IBO to distinguish between jobs that were newly created versus jobs that were relocated from elsewhere. However, comparisons across areas permit identification of any obvious off-the-trend movements that can be associated with the CRP or CEP programs. Noting that the composition of employment varies widely from one area to the next, we extend the analysis by constructing counterfactual employment growth rates to shed light on several what-if scenarios.

The city experienced several large swings in total employment from 1984 through 2017. The lowest point was reached in 1991, followed by a period of steady growth through 2001 (see Appendix Figure 4-2). Using the ES-202 zip code by industry employment data and the crosswalk methodology discussed in section 3.2.1, we estimated employment levels and industry composition in the CRP-eligible area versus other commercial areas of Manhattan.⁹ Panel B of Figure 4-8 shows that excluding the CRP eligible area, Manhattan experienced steady employment growth during 1993-2001. On the other hand, the CRP-eligible area (Panel A) had lower employment in 1996 and 1997 than in 1994 and 1995, and finally caught up to the trend seen in other Manhattan commercial areas by 2000.¹⁰ The employment growth rate from 1995 through 2000 was 11 percent in the CRP area, compared with 16 percent in other commercial areas of Manhattan. Therefore, considering the growth in other areas as the trend, we do not observe any significant off-the-trend changes comparing the years before and after 1995. Figure 4-8 also shows that the industry composition of employment in Downtown area has always been very different from the rest of Manhattan. Between 35 percent (2010) to 56 percent (1994) of Downtown jobs are in finance.¹¹ If we exclude finance jobs from our analysis, the employment trends of the CRP area and non-CRP area are actually very similar (see Appendix Figure 4-1). Again, we do not observe any significant off-the-trend changes comparing the years before and after 1995.

Given that industry composition of employment across these areas is different, it is useful to look at employment growth after controlling for these differences. First, we calculate the employment growth rates for each three-digit NAICS industry in non-CRP-CEP commercial areas of Manhattan for 1995 through 2000. Next, by multiplying these rates by the Downtown employment levels in 1995, for each industry, we calculate how many new jobs in Downtown would have been created at non-CRP-CEP area industry employment growth rates. Summing up these changes, there would have been 30,726 more jobs in the CRP area from 1995 to 2000—an employment gain of 14 percent. The actual number was 24,024 jobs—a gain of 11 percent. Therefore, even after controlling for industry composition of employment, we find little evidence to make the case that the CRP area had faster employment growth than other areas of Manhattan.

Note that the descriptive analysis above is subject to a few caveats. First, if a firm moves from Midtown to Downtown, it will affect both the actual and hypothetical employment levels. Second, in certain industries, a single firm can radically change the employment levels of that industry. For example, during

1995-2000, credit intermediation and related activities firms that were in the CRP area lost 11,214 jobs—or 46 percent of net employment growth of that area in the same period. Finally, a program may be effective in slowing down the decline. Without access to firm-level data prior to 2001, it is not possible to make conclusive findings about this. However, during the period 1990 through 1995, the CRP area lost 4.7 percent of its jobs while the rest of Manhattan lost 4.9 percent—a very similar percentage. Therefore, the two areas were on very similar trends prior to 1995 and the start of the tax incentives.

In short, we do not find any evidence that CRP or CEP caused employment growth in their respective target areas. Our analysis does find, however, that Downtown Manhattan experienced lower employment growth rates in 1995-2000 than the rest of commercial Manhattan. This is consistent with the office vacancy rate analysis presented earlier.

4.4 Physical Change and Rental Income

Both the CRP and CEP programs require participants to make minimum physical improvements to the space being leased. In theory, these physical improvements enhance the quality of the building for the tenants, and increase the owners' revenues through lower vacancy rates and higher rents. Depending on the type of improvements, even after the CRP-participating tenant leaves, the unit may remain vacant for a relatively shorter time and the owner can ask for higher rents. In turn, these changes should be expected to raise the bases of the taxes on property and commercial rents.

Given this context, it is reasonable to ask whether the minimum required improvements induce additional investments in the participating buildings and if these investments result in higher rents. With readily usable data on physical improvements only available for CRP applicants from 2010 on, we were forced to look for indirect evidence of the extent of investments using property tax data. While we did not expect that all of the investment required to qualify for CRP benefits would be observed in the property tax data, the amounts reflected in the property assessment records were even lower than we had anticipated.

This section first introduces an economic framework for understanding the minimum expenditure requirements. The conclusion is that the actual expenditures typically far exceed the minimum expenditure requirements, which is consistent with an underlying demand for physical improvements that exceeds the requirements. The next subsection compares assessments of physical changes as recorded in Department of Finance property tax records with CRP and CEP participants' self-reported physical improvements. Here, the conclusion is that 71 percent the CRP and CEP physical improvements are not reflected in assessments. The CRP application forms are not integrated into the property assessment process of the DOF. Therefore, there is not a systematic procedure for linking these physical improvements with property assessments. For more than 60 percent of CRP/CEP participants, zero physical change is recorded in tax records. While expenditures such as carpeting or painting do not register as physical changes that are to be included in property tax base, at least some of the

expenditures would be expected to result in positive physical changes for assessment purposes. Because every dollar of physical improvement that is not recorded as a physical change leads to losses of revenue in every year that follows, this may have resulted in losses of tax revenue.

4.4.1 Evaluating Minimum Expenditure Requirements in an Economic Framework

Are new leases in the CRP/CEP program accompanied with higher physical improvement expenditures than in a typical lease? If not, then the minimum expenditure requirements are not accomplishing anything.

To understand what behavior we should expect in response to CRP requirements, consider the case of a CRP participant with fewer than 125 employees entering into a five-year lease. Suppose that property taxes are \$2.50 per square foot and the firm does not owe commercial rent tax. By participating in the program, the firm receives a total of \$10 per square foot in property tax abatements (after accounting for the phaseout at the end of the benefit period) and in return is required to spend a minimum of \$5 per square foot in physical improvements.¹² Effectively, of this \$10 per square foot, the first \$5 per square foot goes towards the improvements, leaving an extra \$5 per square foot as the incentive for making the investment. The participant can spend this extra \$5 per square foot on anything, including additional improvements.¹³ Expenditures in excess of \$5 per square foot stem from an underlying demand for physical improvements that was present regardless of CRP requirements. Therefore, expenditures of more than \$10 per square foot are definitely the result of an underlying demand.

As an example, if the firm was going to spend \$50 on physical improvements anyway, the \$10 tax break (which is \$5 per square foot net of required expenditures) is not going to incite their expenditure to \$60. We do not know

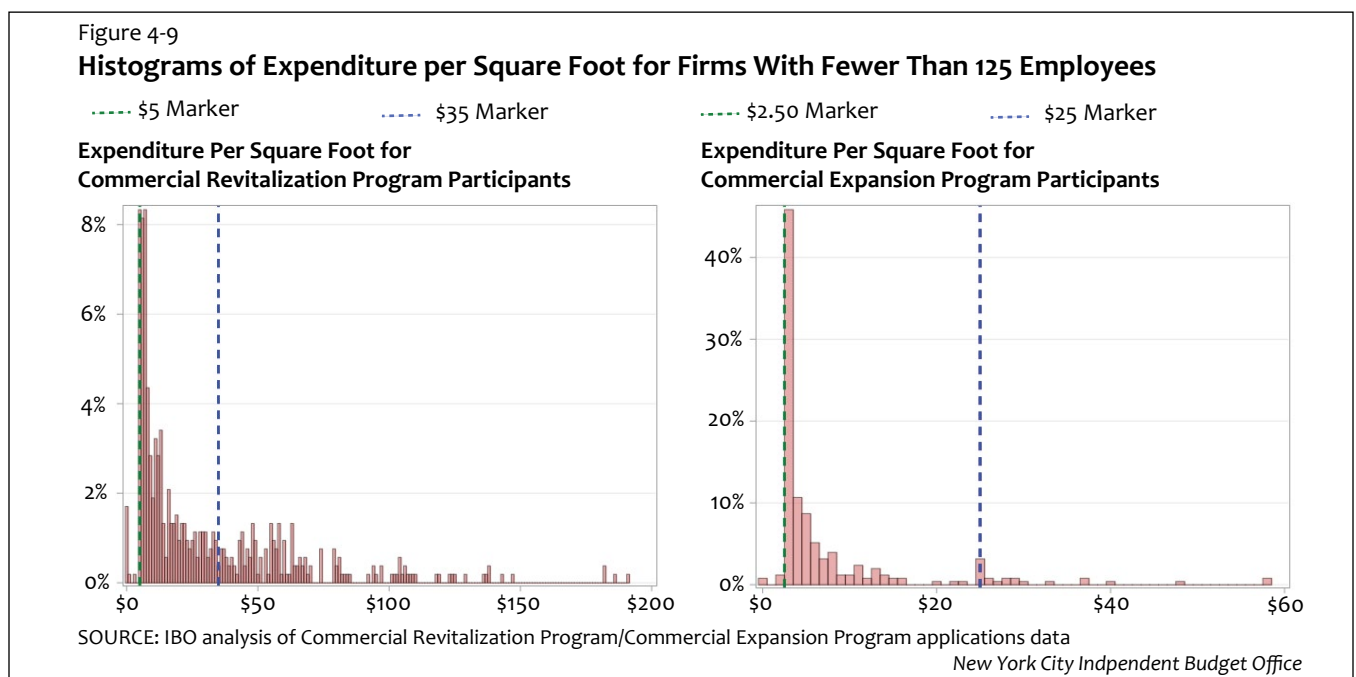
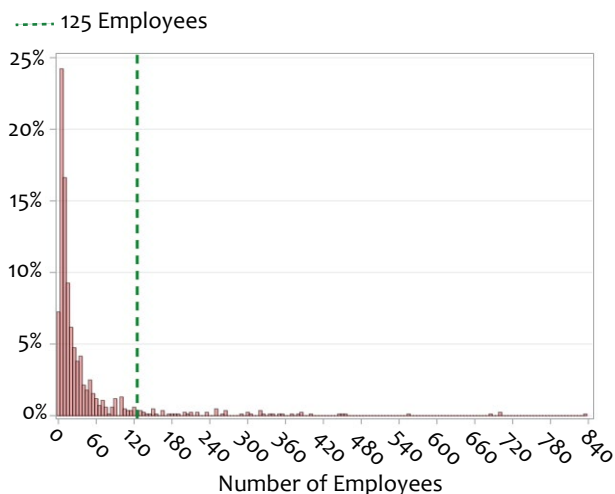


Figure 4-10

Histogram of Number of Employees for Commercial Revitalization Program and Commercial Expansion Program Participants



SOURCE: IBO analysis of Commercial Revitalization Program/Commercial Expansion Program applications data
New York City Independent Budget Office

what that income elasticity of demand for physical improvement is for each firm, but even if it were infinity, their expenditure would not be more than \$55. On the other hand, if the firm was planning on spending \$2 per square foot on physical improvements, it will be better off spending \$5 per square foot instead in order to qualify for the CRP tax breaks.

Expenditures reported by CRP and CEP participants reveal that they typically spend much more than the minimum requirements. Figure 4-9 shows the full distribution of physical improvement expenditures per square foot for CRP and CEP participants with fewer than 125 employees. While there is definitely some clustering around the minimum expenditure requirements for firms with 125 employees or fewer, which are \$5 and \$2.50 per square foot for CRP and CEP, respectively, many participants spend much more than the requirements. In fact, only 20 percent of the CRP participants spent less than \$6 per square foot and only 38 percent spent

less than \$10 per square foot.

Spending more than the required minimum is less pronounced among CEP participants with fewer than 125 employees: 42 percent spent less than \$3 per square foot and 63 percent spent less than \$5 per square foot. Firms receiving CEP are generally industrial and require more space than the typical CRP beneficiary that occupies office space in Lower Manhattan (see Figure 4-4 showing the industry mix of CRP and CEP).¹⁴

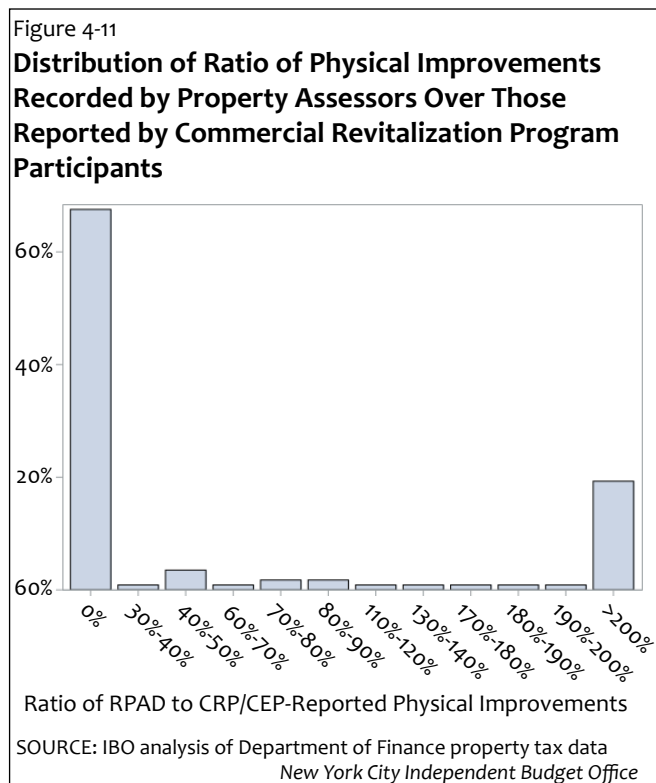
These figures lead us to conclude that the \$5 per square foot minimum expenditure requirement is not a binding constraint for the majority of CRP participants: most would likely have spent much more than \$5 per square foot on physical improvements, even without the tax incentive. The \$2.50 per square foot minimum expenditure requirement seems, however, to have been a binding constraint for a larger share of CEP participants, many of which occupy newer industrial spaces.¹⁵

Given that participants with more than 125 employees face much higher expenditure requirements for the same benefits received by smaller firms (\$35 per square foot instead of \$5 per square foot for CRP and \$25 per square foot instead of \$2.50 per square foot for CEP), one might expect fewer participants with more than 125 employees. However, this does not seem to be the case when we consider the distribution of the number of employees for the two programs shown in Figure 4-10. Although only 8 percent of participants have more than 125 employees, there is no clear drop around 125 employees. This is consistent with our previous finding that many participants—including smaller firms—are spending much more than the \$5 minimum requirement anyway; 32 percent of firms with fewer than 125

employees spent more than \$35 per square foot. Therefore, requiring larger firms to spend more does not appear to have been a major impediment to participating in the program.¹⁶

4.4.2 Capture Rate of Physical Improvements in Tax Records

A physical improvement captured in property tax assessments increases the city’s property tax base in all the following years. IBO’s analysis shows that the physical changes recorded in the property tax assessments are much lower than those reported by the CRP/CEP participants to the Department of Finance. In some cases the improvements reported for CRP/CEP purposes may not involve work that would trigger a physical change assessment by the department. In many cases, though, the tax assessments show zero physical improvements. It is surprising that so many of the expenditures would not trigger a higher physical change assessment.



The actual expenditure records only include the units of a building that applied for the program, while the tax records reflect the physical improvements for all the units in a building. Therefore, all else equal, one would expect the physical changes recorded in tax assessments to be higher than those reported in CRP/CEP applications. On the other hand, the DOF reporting and data collection is likely lagged by a couple of years. Using the expenditure data of 2010-2015, we account for such lags by aggregating actual expenditures for 2010 through 2013 from the application data and comparing them with aggregate tax records over 2010 through 2015.

Figure 4-11 shows the distribution of the ratio of these aggregate physical improvements in tax records over those reported by CRP/CEP participants. For over 60 percent of firms receiving CRP/CEP benefits, city tax records recorded no physical improvements for the building in which the firm was located from 2010

through 2017. About 20 percent of participants had tax records showing physical improvements that exceed 200 percent of the reported CRP physical improvements. These are very likely to include investments unrelated to the CRP and CEP participants. Averaging the same numbers, the tax records only capture 29 cents on the total dollar value of the CRP/CEP physical improvements.

Although physical improvements data from CRP/CEP applications are not available before 2010, using the 2010-2017 data, on average, each participating building spent \$1.3 million (\$35 per square foot, 2017 dollars) on physical improvements. Even the buildings that had recorded zero physical change in RPAD (the 68 percent of buildings shown in Figure 4-11) had on

average \$842,000 in physical improvements in CRP/CEP records. While it is conceivable that some of the CRP/CEP physical improvements may not trigger a physical change in property tax assessments, it is difficult to believe that none of it does.

While it is hard to know how much of the physical change the tax record is missing, every dollar of physical improvement that is not recorded as a physical change leads to significant losses of revenue in every year that follows. For example, until 2017, the present value of lost tax revenue for every \$100 of physical change that the city did not capture in 1995 is \$151.20. This calculation assumes a depreciation rate of 2.5 percent for physical improvements and discount rate of 5.0 percent for present value calculations (see Appendix Table 5-2 for calculation). The Department of Finance could update its procedures to take advantage the construction and other improvement data reported by CRP/CEP applicants for assessment purposes.

5. Relevance

The relevance of CRP and CEP relies on both the status of office vacancy rates and employment in New York City and the analytical soundness of the justification for government intervention in the nonresidential rental market. Downtown is no longer experiencing office vacancy rates that were above 20 percent in the early 1990s. As mentioned before, Downtown office vacancy rates, ranging from a low of 3.5 percent in 2000 to a high of 13.7 percent in 2003, have averaged 8.5 percent since 2000 and have been similar to Midtown's.

Let us suppose that office vacancy rates are too high—that is, they are far from vacancies that result from normal turnover of tenants. Government intervention may be justified by either a well-identified market failure or competition with other governments. To identify market failures, economists often ask whether the free market works reasonably well on its own without much governmental inference. If some well-defined market failure is identified in the nonresidential rental market of Lower Manhattan, subsidies that target a lower office vacancy rate may be justified. Local governments may also compete with each other to encourage the inflow of productive resources and create jobs through subsidies and other policy levers. Such subsidies are not in response to any market failure, but are relevant for job creation and economic growth.

Taking the free competitive market economy as the counterfactual, the burden of proof lies on the proponents of any subsidy. They would need to show why the free market fails at achieving the goals of the program and that the program will be an improvement in free market outcomes. Given that the text of the law or the memoranda in support of the CRP and CEP do not refer to such justification, we may review standard justifications for a subsidy and discuss if any of them are analytically sound and convincing when presented in support of the goals of the CRP and CEP.

Externalities, redistribution of income, and economic cycles are some of the various market failures commonly cited to justify government subsidies. None of these standard market failures can consistently justify different aspects of CRP and CEP. For instance, there may be positive spillovers associated with some of the physical improvements that CRP and CEP require, but it is not clear why the government would want to subsidize all improvements equally or why it would only subsidize improvements in CRP/ CEP-eligible buildings.

Subsidizing increased employment is a classic case of tax competition between local governments. However, it is not clear why a job created in Downtown would be prioritized over one in Midtown given this perspective.

6. Consistency

Owners of Lower Manhattan buildings may benefit from multiple programs that incentivize improvements and renovations. Lower Manhattan nonresidential tenants may also be eligible for other programs that incentivize higher employment or physical improvements. Some of these programs are available beyond Lower Manhattan. Also, eligibility in some of these programs may depend or be facilitated by participation in others. Buildings in the boroughs outside Manhattan are in a similar situation. This section provides an overview of these programs and discusses how they are related to the CRP and the CEP.

The most significant program that Lower Manhattan owners may currently use for improvements and renovations is the Industrial and Commercial Abatement Program (ICAP). ICAP, which was enacted in 2008, provides property tax abatements for periods of up to 25 years. To be eligible, industrial and commercial buildings must be built, modernized, expanded, or otherwise physically improved. ICAP's more generous predecessor, the Industrial and Commercial Incentive Program (ICIP), targeted the same behavior and ran from 1984 until 2008. When building owners participate in ICAP or ICIP their prospective tenants become eligible for other programs. The tenants of ICAP participants may be eligible for the Lower Manhattan Energy Program (LM-EP) and the tenants of ICIP participants may be eligible for the Lower Manhattan Relocation and Employment Assistance Program (LM-REAP, discussed below).

There is no language in the section of the state's Real Property Tax Law establishing CRP and CEP indicating that minimum physical improvements for CRP and CEP should be made up of investments uniquely linked to CRP and CEP eligibility. Therefore, any investments made for any other program may count again to satisfy CRP eligibility criteria. ICIP participants typically had varying lengths of time to complete the construction, most commonly three years. ICAP participants have four years to complete construction or renovation. Within these time periods, concurrent participation in the CRP and CEP programs is theoretically possible.

For example, consider a new tenant in Lower Manhattan with 50 employees, 5 of whom are relocating from outside New York City. Suppose the tenant rents a 10,000 square foot space that is eligible for the CRP program and spends \$50,000 on physical improvements. Also, the tenant's annual energy usage is \$3 per square foot, but the building is eligible for the Lower Manhattan Energy Program. Table 6-1 shows the benefits that this tenant may receive through four different tax expenditure programs. Assuming the owner took full advantage of all four programs, these program benefits would provide a 17 percent rent subsidy during the first five years.¹⁷ About 62

Lower Manhattan Space	Year 1	Year 2	Year 3	Year 4	Year 5**
Rent per Square Foot	\$30	\$30	\$30	\$30	\$30
Rent Before Tax	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000
Commercial Rent Tax	\$11,700	\$11,700	\$11,700	\$11,700	\$11,700
Rent After Tax and Before Benefits	\$311,700	\$311,700	\$311,700	\$311,700	\$311,700
Commercial Revitalization Program Property Tax Abatement	\$25,000	\$25,000	\$25,000	\$16,667	\$8,333
Commercial Revitalization Program Commercial Rent Tax Savings	\$11,700	\$11,700	\$11,700	\$11,700	\$11,700
Lower Manhattan Energy Program*	\$4,725	\$4,725	\$4,725	\$4,725	\$4,725
Lower Manhattan Sales and Use Tax Savings*	\$1,109	\$0	\$0	\$0	\$0
Lower Manhattan Relocation Employment Assistance Program	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Total Savings from Incentives	\$57,534	\$56,425	\$56,425	\$48,091.50	\$39,758.25
Total Savings from Incentives per Square Foot	\$5.75	\$5.64	\$5.64	\$4.81	\$3.98
Total Cost in Lower Manhattan	\$254,165	\$255,275	\$255,275	\$263,609	\$271,942
Lower Manhattan Effective Rent	\$25.42	\$25.53	\$25.53	\$26.36	\$27.19

SOURCES: IBO analysis of program benefits
NOTES: *These figures are reported using Downtown Alliance's Incentives Calculator.
**Years 6 through 12 are not shown in the table. However, LM-REAP is the only program with 12 years of benefits.

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percent of these tax incentives are attributable to the property and rent tax subsidies of CRP. The Lower Manhattan Energy Program, Lower Manhattan Sales and Use Tax Exemption (LM-STEP), and Lower Manhattan Relocation Employment Assistance Program comprise the other 38 percent. All three of these programs incentivize renovations and improvements (see Appendix Table 5-2 for calculation steps).

LM-STEP provides sales tax exemptions on build-out expenditures for tenants signing new or renewal leases of 10 years or more. If the unit is part of the World Trade/World Financial Center site, expenditures for furniture, fixtures, and equipment (FF&E) of new office space are also exempt from sales tax. The program incentivizes the occupancy of Lower Manhattan buildings, without imposing specific requirements for building age or expenditures. CRP participants may use LM-STEP benefits concurrently as long as their leases are 10 years or longer.

LM-EP provides up to a 45 percent reduction on regulated electric costs for tenants in Lower Manhattan buildings in which renovations exceed 20 percent to 30 percent of the property's assessed value. Although there are restrictions about the timing of investments, these expenditures may concurrently satisfy the requirements of ICAP and CRP. In such cases, the tenant/owner may take advantage of three different programs by paying the price for only one.

LM-REAP provides a refundable tax credit of \$3,000 per job for 12 years to businesses that relocate to eligible premises within Lower Manhattan. To be eligible, businesses need to either relocate from outside New York City or move a significant number of employees within Manhattan. Eligible premises

must be nonresidential and must have been improved by construction or renovation. Again, the required improvements may satisfy the eligibility criteria for ICIP and CRP at the same time.

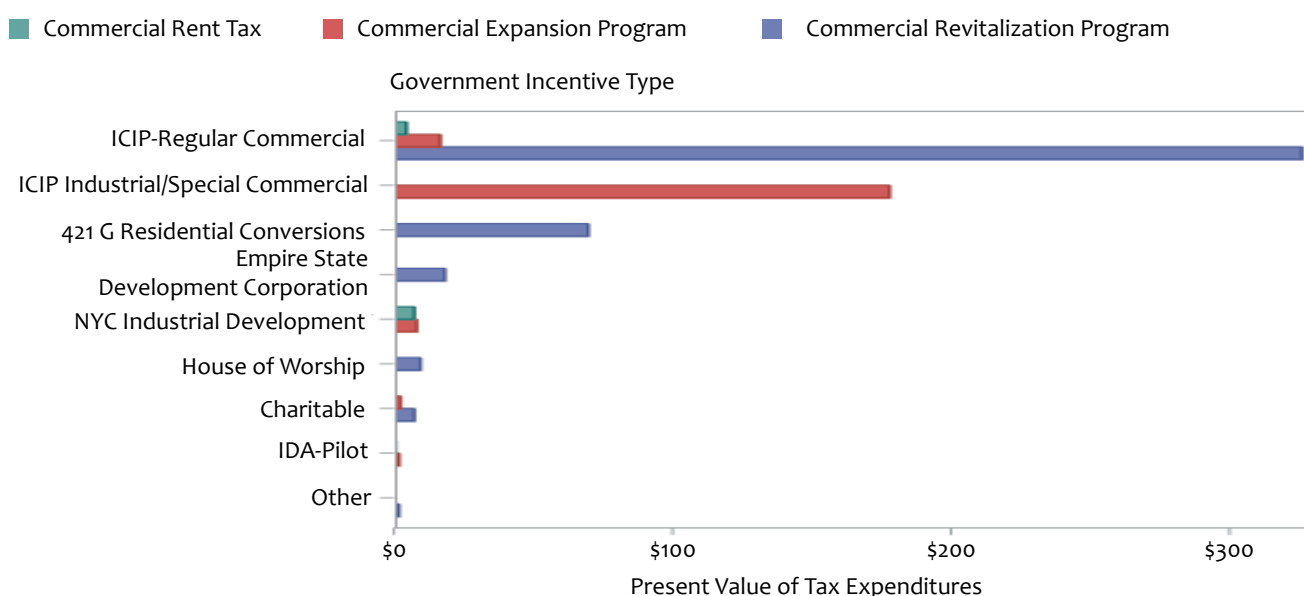
6.1 Concurrent Property Tax Benefits of CRP and CEP Participants

As noted earlier, CRP and CEP work parallel to other programs with similar goals and participation requirements. To this end, this section documents the types and amounts of property tax exemptions that have some participation requirements for the buildings that had some CRP and CEP participating units and the years when a building had some units enrolled in these programs. Figure 6-1 shows the present value of tax expenditures by exemption type received from 1995 through 2016 in 2017 dollars.¹⁸ These numbers are measured for different programs indicated by different colors.

Among these programs shown in Figure 6-1, ICIP was discussed earlier and 421-g will be discussed in more details in the next section. New York City industrial development exemptions are discretionary tax incentives for commercial projects with significant economic benefit to New York City and are administered by the city’s Industrial Development Agency (IDA). IDA’s payment in lieu of taxes (PILOT) is another form of payment to subsidize the specific projects that are approved by IDA.

Most prevalent programs do not necessarily have investments that can be used to satisfy CRP/CEP requirements. For the original CRP region, the most prevalent of these programs are ICIP and 421-g. These programs both require significant amounts of investments by their participants. ICIP-Industrial

Figure 6-1
Present Value of Tax Expenditures on the Buildings of the Commercial Revitalization Program and Commercial Expansion Program Participants
 2017 dollars in millions



SOURCE: IBO analysis of Department of Finance property tax data

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is the largest exemption concurrently received with CEP. Similar to ICIP, the investments in projects that receive IDA exemptions may be used to satisfy the minimum physical improvement requirements of CRP and CEP. However, only a portion of the 421-g investments done to common areas of the building may be used to satisfy the minimum physical improvement requirements. In these cases, the participation in CRP or CEP may not induce any additional physical improvements.

In addition to the exemptions shown in Figure 6-1, we found \$692 million of tax expenditures (2017 present value) through Port Authority-World Trade Center, State Lands and Buildings, parks, MTA-NYC Transit, or Battery Park City Authority projects (see Appendix Figure 4-5 for a breakdown of these tax expenditures). These exemptions do not have any participation requirements and do not entail any investments that may overlap with those of CRP/CEP.

The benefits of ICIP's successor, ICAP, are given through property tax abatements. Using the 1995-2014 data and similar analysis to the above, IBO did not find any CRP participants that were taking advantage of ICAP in the data available to us.¹⁹ The 421-g abatements to CRP participants reach as high as \$4 million in a single year. For ICIP, Green Roof, and Solar Electric Generating System abatements CRP participants received benefits of less than \$1 million in aggregate, annually.

6.2 Conversion of Commercial to Residential (421-g)

As discussed earlier, the 421-g program was created at the same time as CRP as a part of the Lower Manhattan revitalization initiative. This program incentivized conversion of nonresidential buildings to residential use through up to 14 years of a real property tax exemption on the increase in assessed value due such conversion and a real property tax abatement of existing property taxes. While 421-g expired in 2006, from 1995 to 2006 CRP and 421-g were substitutes for each other as they both incentivized occupancy of older commercial buildings in Lower Manhattan. However, IBO's analysis shows that in many cases the two programs were not substitutes.

Out of 12.7 million square feet of space that received 421-g benefits, only 62 percent would have been eligible for CRP benefits: 29 percent were not nonresidential or mixed use and 9 percent were built after 1975. At the same time some of the 421-g participants may still be eligible for the CRP: based on Department of Finance data, 4 percent of the space that received 421-g was never categorized as residential, and 2 percent was turned back to nonresidential use afterwards. Since the two programs were not substitutes for each other in all cases, 7.9 million square feet of CRP eligible space was instead withdrawn from the commercial market and received benefits under 421-g.

7. Limitations and Recommendations for Future Evaluations

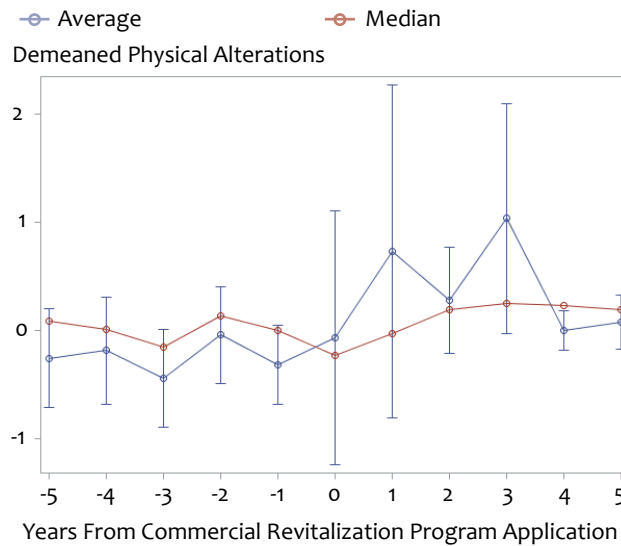
The analysis and the methodology used in IBO's evaluation were restricted in many ways by data availability. This section lists these restrictions and provides some recommendations for data collection, maintenance, and analysis.

7.1 Data Limitations

Office Rents and Vacancy Rates. This report used neighborhood level data collected from Cushman & Wakefield reports (1984-2016). Using this data, no neighborhood effects were observed as a result of the CRP. As discussed earlier, the program participants would have moved to the buildings that they did even absent CRP incentives, or they moved from other buildings within the CRP area. The latter would be highly undesirable. However, the major shortfall of this data set is that comparison of participating, eligible, and other buildings are not possible. Furthermore, IBO's analysis could not account for the changes that result from building characteristics. Building-level vacancy data are currently collected by DOF under Real Property Income and Expense reports. However, IBO does not have access to this data, as its release by the Department of Finance is prohibited under section 11-208.1 of the city's Administrative Code. Access to this data would have enabled this evaluation to apply the difference in differences strategies discussed in the methodology section to further the analysis.

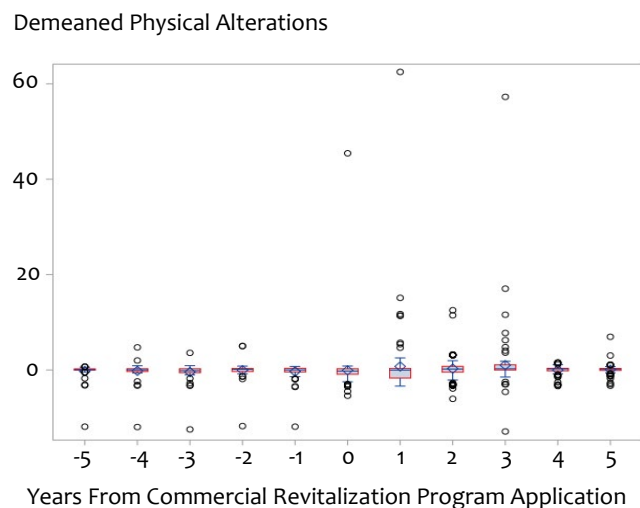
Employment. The zip code by industry employment data from Department of Labor ES-202 data (1989-2010) enables the analysis of employment levels in city neighborhoods. It is not clear, however, where the new employment is coming from until one has access to establishment by address data that is matched over time. The Quarterly Census of Employment and Wages can potentially be used for such purposes. But IBO does not have access to the data from outside of the city, and the data starts in 2000. Therefore, these data cannot be used to make before and after comparisons of the 1995 and 2000 changes in tax incentives. And given the low level of participation in the 2005 expansion of the commercial rent tax exemption, there is little to be gained by before and after comparisons of the change in 2005. To the extent that employment migration data is available around any of those older time periods, one can further extend the analysis.

Figure 7-1
Means, Medians, and 95 Percent Confidence Intervals of the Means for Demeaned Physical Alterations in the Years Before and After Commercial Revitalization Program Participation



SOURCE: IBO analysis of Department of Finance property tax data
 New York City Independent Budget Office

Figure 7-2
Box Plot and Jitter Scatter Plot of Demeaned Physical Alterations in Years Before and After Commercial Revitalization Program Participation



SOURCE: IBO analysis of Department of Finance property tax data
 New York City Independent Budget Office

Owners’ Rental Income. IBO receives these data for owners who challenged their property tax assessments. The Tax Commission Income and Expense reports (1984-2017) effectively include a small subsample of buildings often observed in nonconsecutive years. All commercial buildings and residential buildings with 11 or more apartments are supposed to file Real Property Income and Expense reports each year. As mentioned earlier, IBO does not currently have access to the building-level RPIE data, which is an important resource for research purposes. If access were granted, a future evaluation could examine the effect of CRP or CEP on owners’ income and expenses through the DD or DDD methods described before.

Building Characteristics. While RPAD is a rich dataset, its contents are determined by its role in administering the real property tax. Although gross square footage, number of floors, number of units, tax exemptions, etc. are recorded in this dataset, it does not include any characteristics such as the number of bathrooms, condition of the building, or the last time the unit was painted. Therefore, it is not possible to measure how similar or dissimilar any two buildings might be—information that is essential for designing and evaluating effective programs.

Physical Improvements. As discussed in section 4.4.2, the physical improvements recorded in tax records do not seem to closely follow the expenditures such as those made by the CRP participants. Figures 7-1 and 7-2, left, show how this data-quality issue affects our analysis. In both figures, the horizontal axis shows the years from CRP application for all CRP participants and the vertical axis shows the physical alterations as shown in tax records demeaned by year and building. In the first figure, we can see the average, median, and 95 percent confidence bands of the mean. We expect the physical alterations to be relatively higher in the years after CRP participation. While we see this effect in

the average physical improvement, the confidence intervals are too large to be useful and the median does not show any such movements.

We inspect the data more closely in the box plot presented in Figure 7-2. The box and whiskers in a box plot show the lowest value (excluding outliers),

first quartile, median, third quartile, and highest value (excluding the outliers). The outliers are the values that are higher (lower) than 3/2 times of the 3rd (1st) quartile and are shown by circles in this figure. This box plot and plotted outliers show that the observed effects in the mean (shown in Figure 7-1) are the result of a small number of outliers in the data, and the rest of the distribution is relatively stable. In most of the cases, the physical alterations remain around zero before and after program participation. Therefore, any comparison of physical improvements using this data is very sensitive to the specific observations that are included in the data and were not included in this report.

Further analysis of these data also showed that the increases in physical improvements are not observed with a consistent frequency over time. This suggests that the assessment procedures may have changed over time, which further overshadows the reliability of the time series aspect of these data for evaluation studies.

7.2 Shortfalls in Record-Keeping

CRP and CEP Applications. For 2010-2017, all the details of CRP and CEP applications are available from DOF in spreadsheet format and were provided to IBO. These include addresses, lease terms, program types, amount of expenditures, square footage of leased space, number of employees, owner's name, tenant's name, and other variables. These data were crucial to IBO's analysis in the previous sections. Unfortunately, this level of detail is not available prior to 2010. For 1995-2010, expenditures, number of employees, and many other variables were recorded. While the hard copies of the application forms are available for 2005-2010, the forms from prior years were destroyed. In order to estimate participation rates for those years, IBO had to impute the gross square footage of the buildings. Because expenditures and number of employees depend on the specific tenant's activities, it is not possible to impute these numbers for 1995-2010 without risking serious errors. If these numbers were available, however, IBO could estimate the revenue losses in section 4.4.2 or compare employment trends in CRP and CEP participants.

Commercial Rent Tax Data. This dataset, while available to IBO, did not record the CRP Special Reduction amount as a separate data item until 2017. Therefore, IBO was not able use these data to identify the participants' units, square footage, or rents. Furthermore, it is not possible to compare the rents of CRP participants with those of other tenants. Such analysis would shed light on the extent to which owners are able to negotiate higher rents when their rental unit is eligible for CRP.

Property Tax Abatements. While the property tax exemptions are meticulously recorded and preserved over time, tax abatements only appear in DOF's open balance files. In the version of the open balance file that the finance department shares with IBO, once the balance is settled, there will be no record of the abatements awarded. Given that the CRP and CEP property tax benefits are awarded as abatements, such proper records would have been invaluable to this study. There are significant hurdles to calculating the

total amount of benefits over time and participants' concurrent abatements, or identifying all the participating buildings using this dataset. DOF is now adopting new record-keeping procedures that will solve this problem going forward. However, the historical records seem to have been lost forever.

7.3 Suggestions for Future Evaluations

Looking forward, once a tax expenditure program with measurable goals becomes law, it is appropriate for the same legislation to include provisions for tracking the necessary data to actually measure the outcomes of interest. For the CRP, such outcomes would have been office vacancy rates in older buildings, new buildings, and buildings that are not in the eligible areas. It is noteworthy that sometimes surveying just a sample of the population is the most cost efficient way to ensure that a policy is meeting its goals. At the same time, the law may include guidelines for record-keeping such that the information in the application forms is preserved.

Endnotes

¹Unless otherwise noted, all years refer to city fiscal years.

²Cushman & Wakefield vacancy rate figures of fourth quarter of the previous year (to match GDP numbers).

³For condo units, the total square footage of all condo units in the building is needs to be larger than 25,000 square feet, not the square footage of the individual condo unit.

⁴These numbers are calculated based on 2016 building square footage. In 2002, the Afacts for zip codes 10001 and 10011 were 38 percent and 67 percent, respectively. If we had based the calculation on square footage of land, rather than of buildings, 45 percent of the land area in zip code 10001 and 66 percent of the land in zip code 10011 would make up the Chelsea submarket in 2016. While the percentages based on land square footage have not changed much over time, they are dramatically different from the shares based on commercial square footage, reflecting variation in the density of commercial development within the two zip codes.

⁵Cushman & Wakefield Midtown reports of 1991-1994 used larger areas than those depicted in Figure 3-1. These areas are Plaza, Midtown West, Grand Central and Midtown South. When our analysis goes back that far, we use those delineations to design our study regions.

⁶Nonresidential and mixed-use buildings are defined using a combination of tax class and building class characteristics in the administrative data. New York City properties are divided into four property tax classes: Class 4 consists of all nonresidential property other than some utility company property in Class 3. Class 4 also includes mixed-use property if the commercial use square footage exceeds 50 percent of the building's area. Building class identifies more detail on a building's use and other characteristics. Buildings eligible for CRP are either in Class 4 excluding building classes M, N, V, U, T, Q, W, Y, Z, or have building classes S0, S1, S2, S3, S4, S5, S9, R8, R7, C7, D6, D7, and RK. The same building classes are eligible for CEP, except for hotels and retail. Therefore, the building classes H, K, RK, RH, C7, D6, and D7 are excluded from CEP eligibility list.

⁷Beginning in 2018 this is raised to \$500,000.

⁸The real estate industry uses classes A, B, and C to categorize office buildings. Class B buildings are usually older and of lower quality than Class A buildings.

⁹Other commercial areas of Manhattan are composed of the Cushman & Wakefield areas shown in Figure 3-2.

¹⁰Obviously, we cannot make any comparisons, post-2001, that are relevant to CRP.

¹¹See Appendix Figure 4-3 Industry Composition of Employment in Manhattan by CRP Eligibility Area (1989-2010), Appendix Figure 3-2 Industry Composition of Employment in Manhattan by CRP Eligibility Area (1989-2010).

¹²They receive \$2.50 in the first three years, two-thirds of that in year four, and one-third of that in year five. This is equal to four times \$2.50, or \$10.

¹³Because the owner and renter apply together, the division of this \$10 is a little more complicated. In the most extreme case the owner raises the rent by \$5 per square foot and the renter uses that \$5 to pay for the extra rent. In this study, we are assuming that the negotiated rents are not affected by CRP participation.

¹⁴We also observe that CEP applicants cluster around the \$25 marker, which is the minimum expenditure requirement for applicants with more than 125 employees. This may be a result of changes in the number of employees or misreported figures.

¹⁵The CEP buildings need to be built before 1999 as compared with 1975 for CRP buildings.

¹⁶After considering inflation, the \$5 minimum expenditure in 2010 is equivalent to only \$3.50 in 1995 (minimum expenditure requirements have remained at \$5 throughout the lifetime of the CRP program). Therefore, the \$5 minimum expenditure may be more significant requirement in 1995 than it is in 2010. Therefore, we can speculate that a larger proportion of applicants only spent the minimum required expenditures in 1995. However, the most relevant numbers are the ones for the recent years, which are presented here.

¹⁷Using 6 percent interest rate and considering 12 years (LM-REAP benefit years), present value of benefits was used for these calculation.

¹⁸For present value calculations, 5 percent interest rate was used. For example, if there are two building that each received \$6 million of ICIP exemption in years 2010 and \$4 million in 2016, the amount shown in this figure is $\$12M \times (1.05)^7 + \$8M \times (1.05)^3$, which is equal to \$25.2 million.

¹⁹As section 7.2 discusses later, IBO does not have access to the full set of property tax abatement records.

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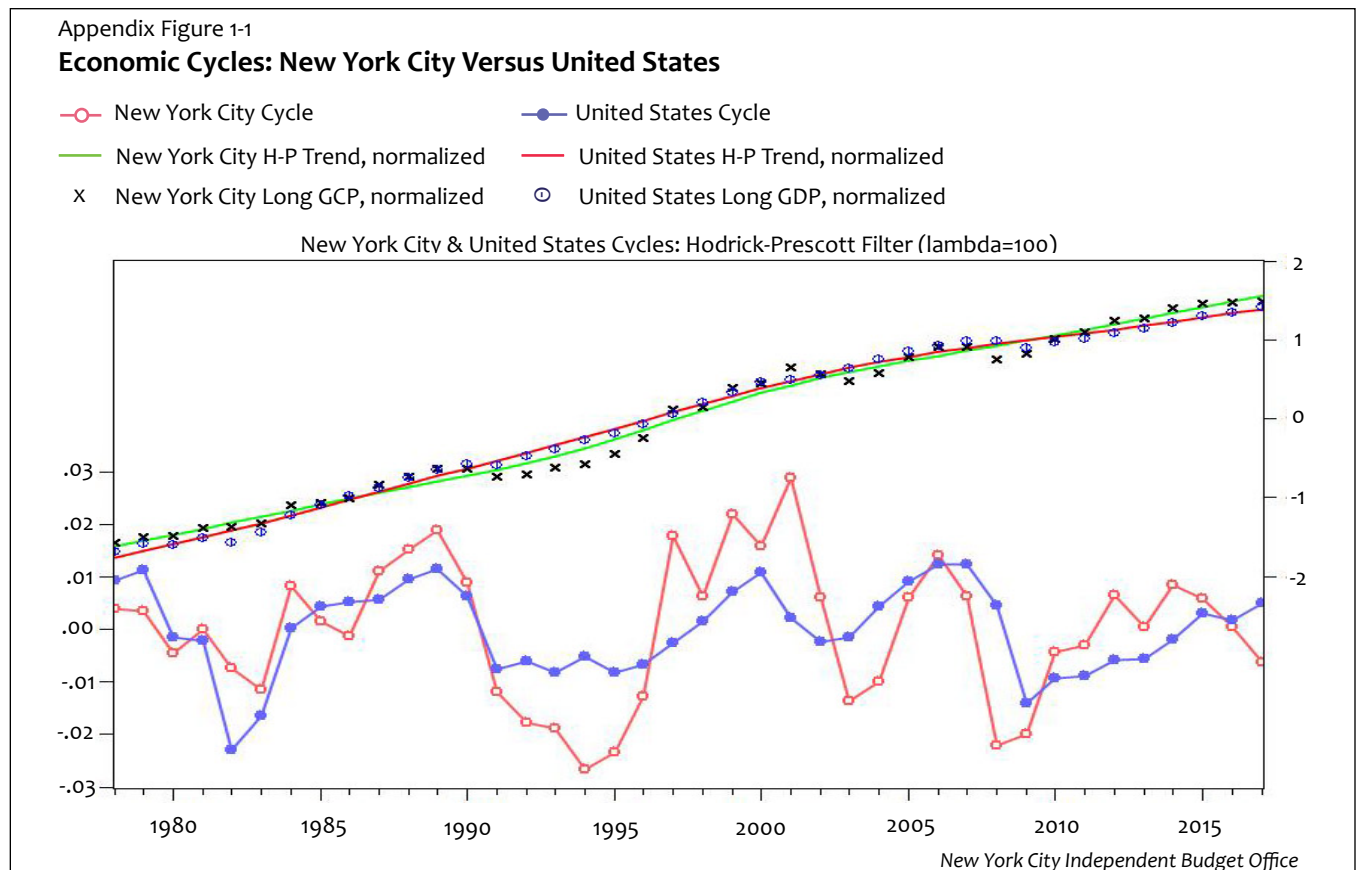
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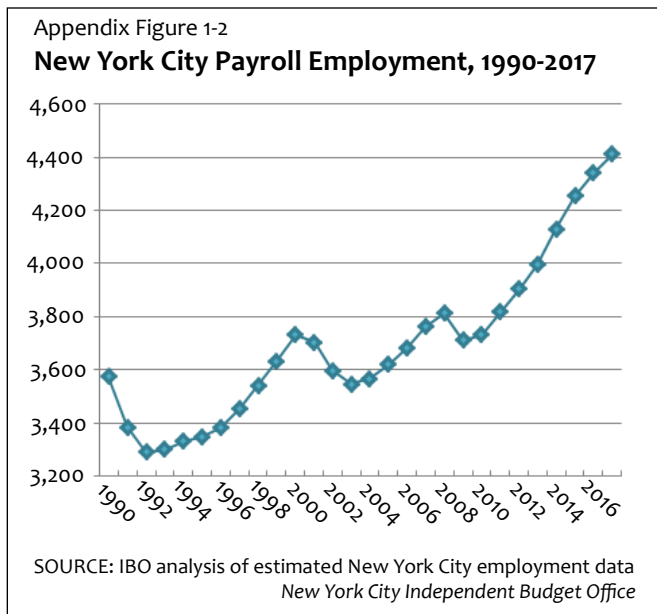
Appendices

Appendix 1 GDP Cycle versus the Trend

Appendix Figure 1-1 shows the cyclical component of the U.S. gross domestic product (GDP) and New York City gross city product (GCP) from beginning of 1978 to beginning of 2016. The Hodrick-Prescott filter (HP filter) is a method of decomposing a time series into a long-term smooth trend and a cyclical component. It has become a tool in real business cycle theory. The filter was popularized in the field of economics in the 1990s by economists Robert J. Hodrick and Edward C. Prescott. After de-trending the annual GDP series using the HP filter, the left vertical axis shows the percentages by which the annual GDP is above its long-term trend in each year. The right axis shows the normalized logs of U.S. GDP, New York City GCP, and the trend components of them. During 1989 to 1990, the U.S. and New York City economies are both in slowing down. Starting in 1991, the U.S. economy is in recovery, but the city’s economy is still in a downturn. Finally, after 1993, the city starts its recovery, which is followed by a few years of rapid economic growth. In fact, in 1996 and 1997, New York City economic growth rates were at 6 percent and 11 percent, respectively.

Appendix Figure 1-2 shows a similar pattern in New York City employment. During 1990 through 1992, employment is sharply decreasing. After 1992, employment starts to increase, but the improvement is



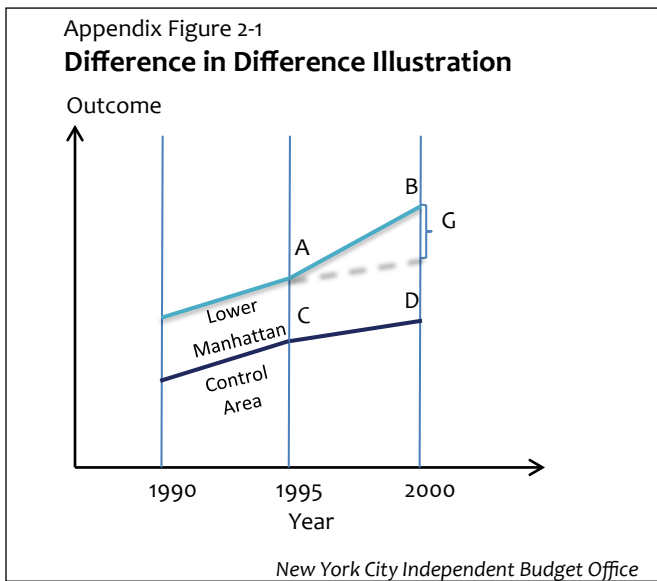


very slow until 1996. Just like the GCP indicated low economic growth rates, although the city’s economy was not in a recession, it was still experiencing a lasting economic slowdown.

Difference-in-differences is a statistical method to estimate the effect of a treatment on an outcome. DD compares the average change over time in the outcome variable for the treatment group with the average change over time for the control group. Therefore, any changes that are the result of factors that affect both the treatment and control groups are not incorrectly associated with the causal effect of the treatment.

Appendix II
Difference in Differences and Triple Differencing Strategies

As a graphical illustration of the DD method, Appendix Figure 2-1, shows the average outcome in the treatment group (Lower Manhattan) with the control areas represented by two separate lines over time. For example, in this study the outcomes may be employment or vacancy rates. The average of the outcome variable for nonresidential buildings built before 1975 is measured at time periods 1990, 1995, and 2000 on the vertical axis. Although the level of the outcome variable is different between the two groups, they move parallel to each other before the CRP in 1995. Therefore, the “common trends” assumption is satisfied and the two groups are comparable at the baseline. After 1995, the outcome of the control group rises slower than in the previous period and moves from point C in 1995 to point D in 2000. However, the outcome of the treatment group rises faster than before and moves from point A in 1995 to point B in 2000. The dashed line represents the outcome of Lower Manhattan if it had continued to move parallel to the control area. Applying the DD method, the evaluator would measure G as the effect of the CRP on the outcome in Lower Manhattan.



Lower Manhattan if it had continued to move parallel to the control area. Applying the DD method, the evaluator would measure G as the effect of the CRP on the outcome in Lower Manhattan.

Not all of the difference between the treatment and control groups at time period 2000 (that is, B-D) is the effect of the treatment, because the treatment group and control group did not start out at the same level in 1995. Similarly, not all of the difference between the outcome of Lower Manhattan in year 2000 and 1995 is the treatment effect, because some of the change is the result of the same forces that affect the control group.

The table on the left summarizes the DD method. Each of the letters A, B, C, and D represent the

Appendix Table 2-1 Calculation of Difference in Differences			
Area/Time	Before 1995	After 1995	Difference
Lower Manhattan	A	B	$E = B - A$
Control Area	C	D	$F = D - C$
Difference			$G = E - F$
SOURCES: IBO analysis of Cushman & Wakefield data New York City Independent Budget Office			

average of the outcome for nonresidential buildings built before 1975 at area/time combinations presented by this table. We can calculate $G = (B - A) - (D - C)$ as the effect of the treatment. This is identical to the DD illustrated in Appendix Figure 2-1.

There may still be considerable biases when estimating a difference-in-differences model. A potential problem in the model described above

may be that changes in the outcome of the old buildings might be systematically different across areas. This may be due to, for example, a different industry mix in Downtown, rather than the policy change. Let us consider a different DD model. Instead of limiting the sample to nonresidential buildings built before 1975 and using the geographic boundaries for CRP eligibility as one of our cut-offs, consider the year-built 1975 as our cut-off. Using this cut-off and only the sample of buildings that are located in Lower Manhattan, the evaluator may use a similar DD analysis to estimate the effect of the CRP. The potential problem with this second DD analysis is that other factors unrelated to Lower Manhattan's new policy might affect the outcomes of the older buildings relative to the newer buildings. For example, changes in demand for newer buildings anywhere in New York City or the simultaneous offer of other incentive programs to locate in one of the areas may have such an effect.

When possible, a more robust analysis than either of the DD analyses described above can be obtained by using both a control area for Lower Manhattan and a control group within Lower Manhattan. Appendix Table 2-2 presents how triple differencing, or difference-in-difference-in-differences, analysis is conducted using all three of the cut-offs: vintage, geographic boundaries, and the year program started. First, separate DD estimates are calculated for before and after 1995. Finally, the difference of these DD estimates ($G'' = G' - G$) yields the DDD estimate.

Instead of creating these tables, the estimates and standard deviations of DD and DDD analysis are often estimated using regression analysis. Such a set-up enables the researcher to also control for the other factors that may affect the outcomes and test for the common trends assumptions (see Wooldridge, 2010; Angrist and Pischke, 2009 for more details.)

The data we were able to assemble for this evaluation does not include the level of detail needed for a DDD analysis. Some of the outcomes were aggregated at the neighborhood level, and some cases were missing critical information. Therefore, this evaluation uses the best possible approach and interprets the results recognizing the limitations imposed by the data restrictions. For example, when analyzing the office vacancy rate data aggregated at the level of Manhattan neighborhoods, DD estimates show the neighborhood effect of giving older buildings access to the CRP program. If a tenant moves from a post-1975 building within Lower Manhattan to a pre-1975 one, our estimate will show no CRP effect. (Note that, if the data allowed us to identify such a move, from government's perspective, it would have been labeled as one of the undesirable consequences of the CRP—subsidizing relocations from within the city is zero-sum policy. However, if this tenant moved from outside Lower Manhattan, a positive effect would be estimated.)

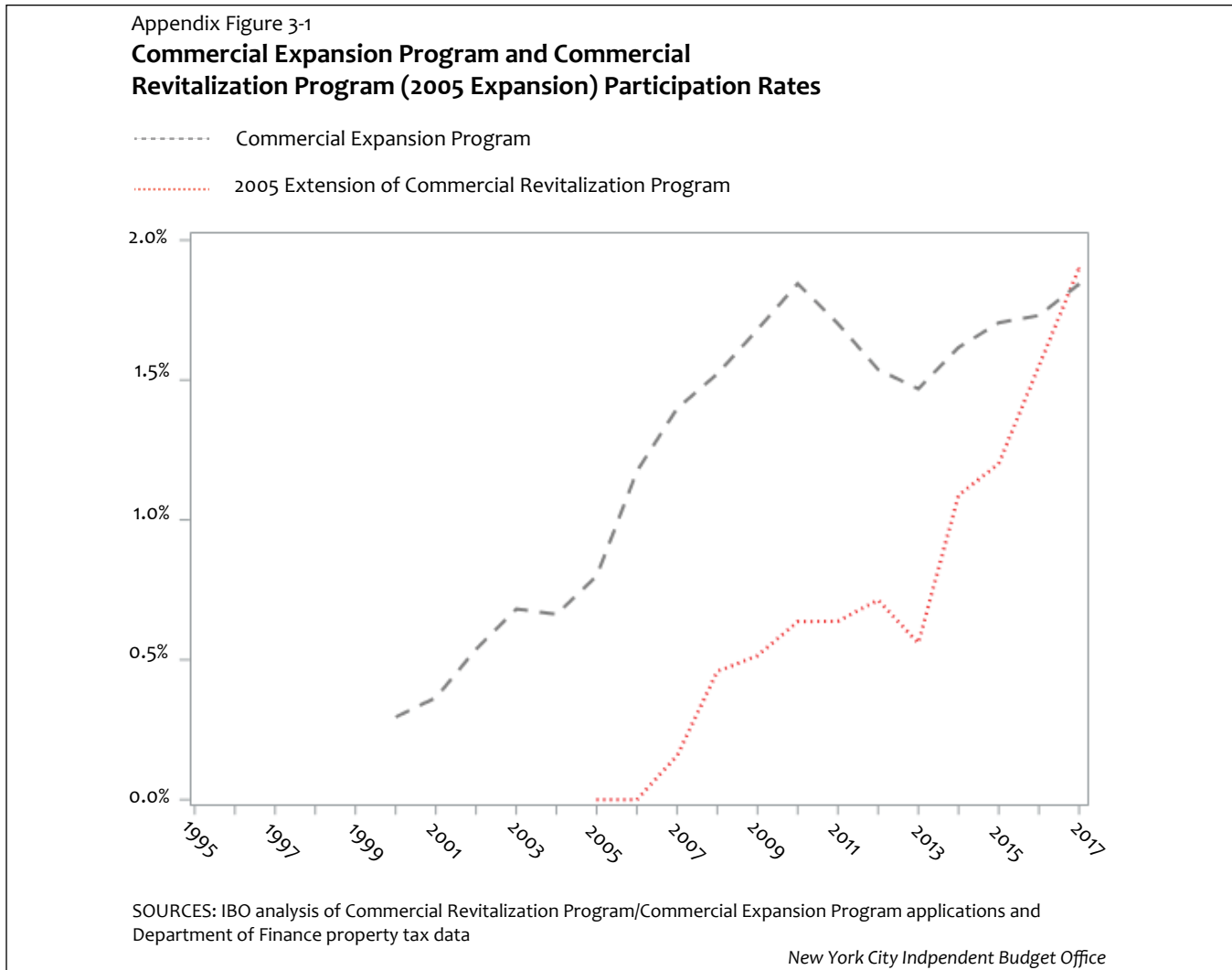
Appendix Table 2-2
Calculation of the Triple Difference Analysis

Year	Before 1995			After 1995			
	Post-1975	Pre-1975	Difference	Post-1975	Pre-1975	Difference	
Lower Manhattan	A	B	$E = B - A$	A'	B'	$E' = B' - A'$	
Control Area	C	D	$F = D - C$	C'	D'	$F' = D' - C'$	
Difference			$G = E - F$			$G' = E' - F'$	
DDD Effect							$G'' = G' - G$

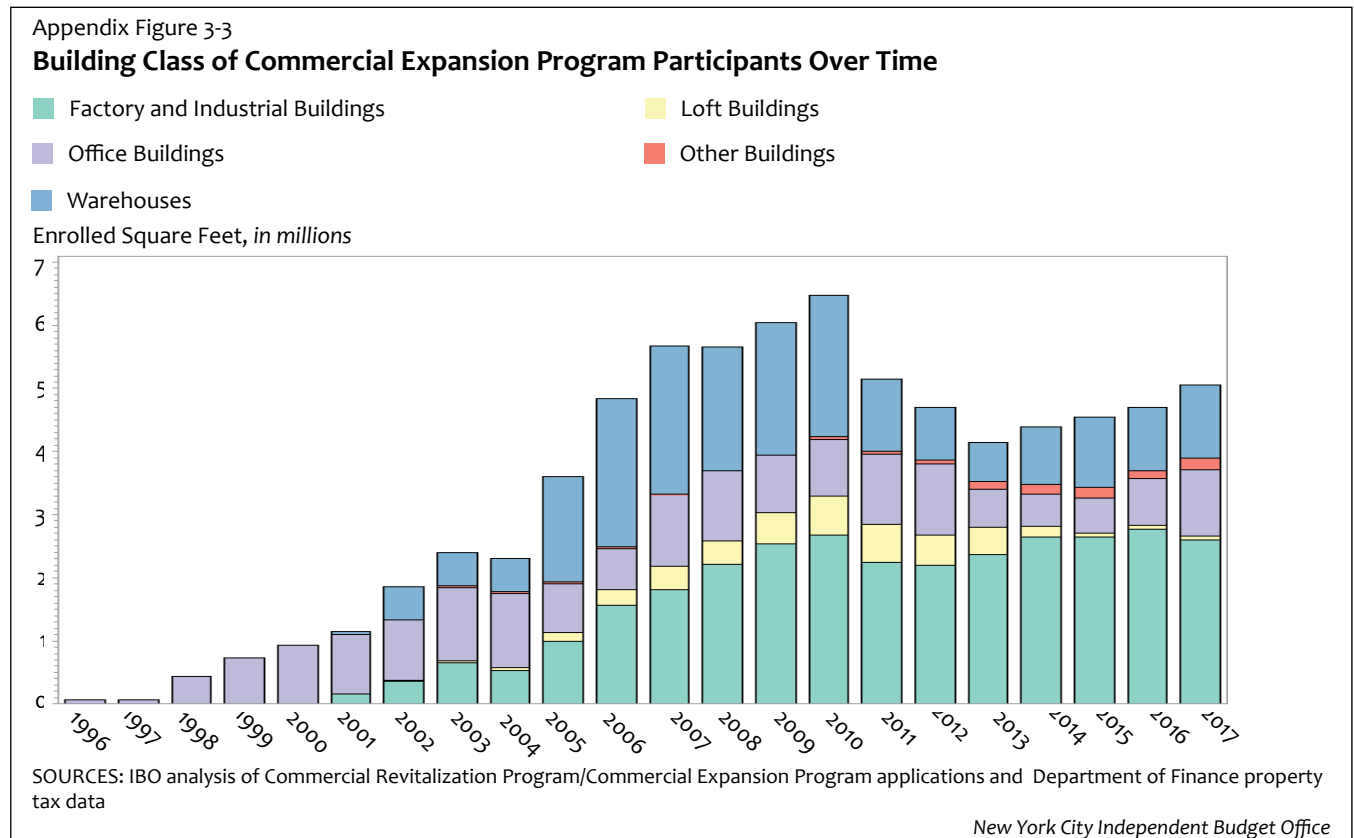
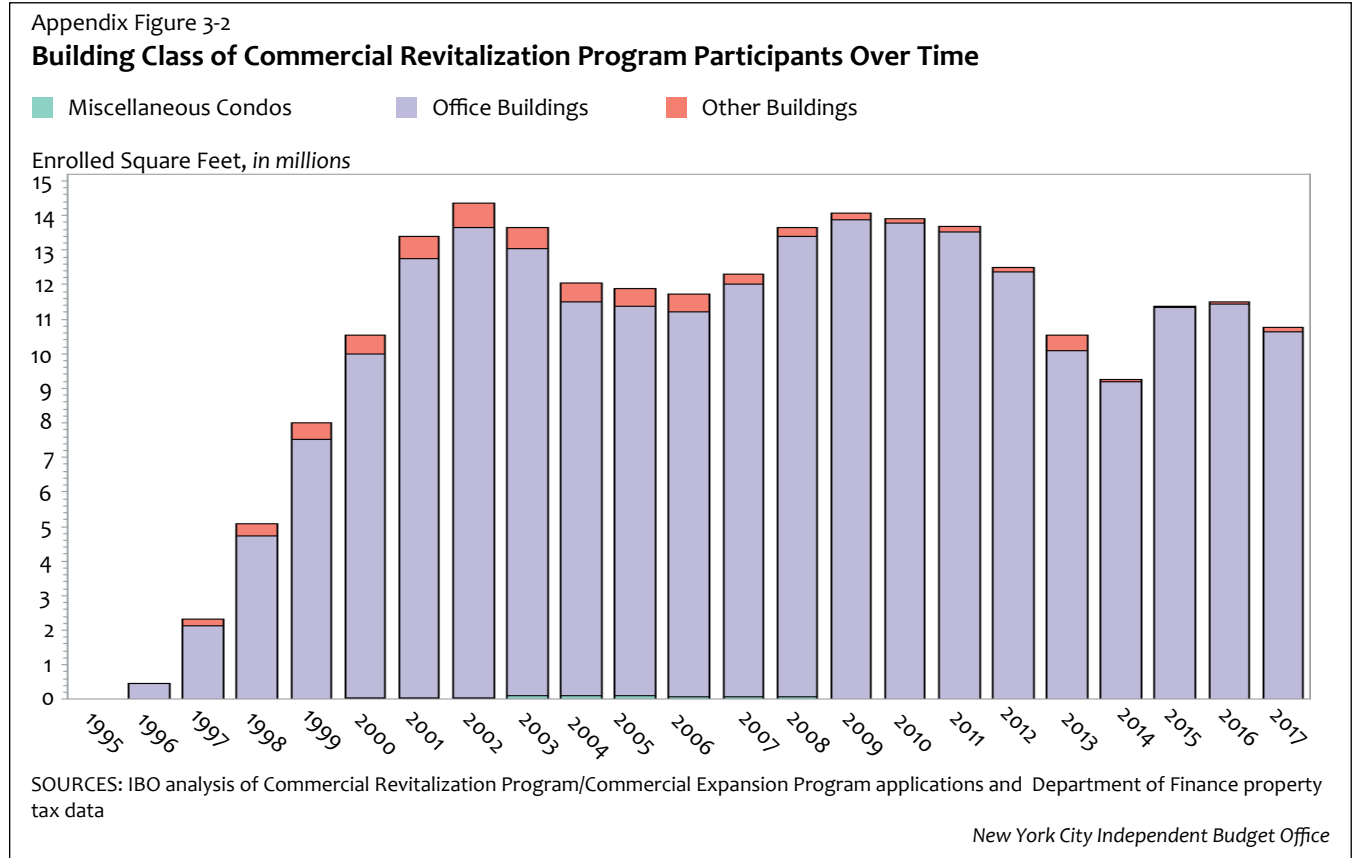
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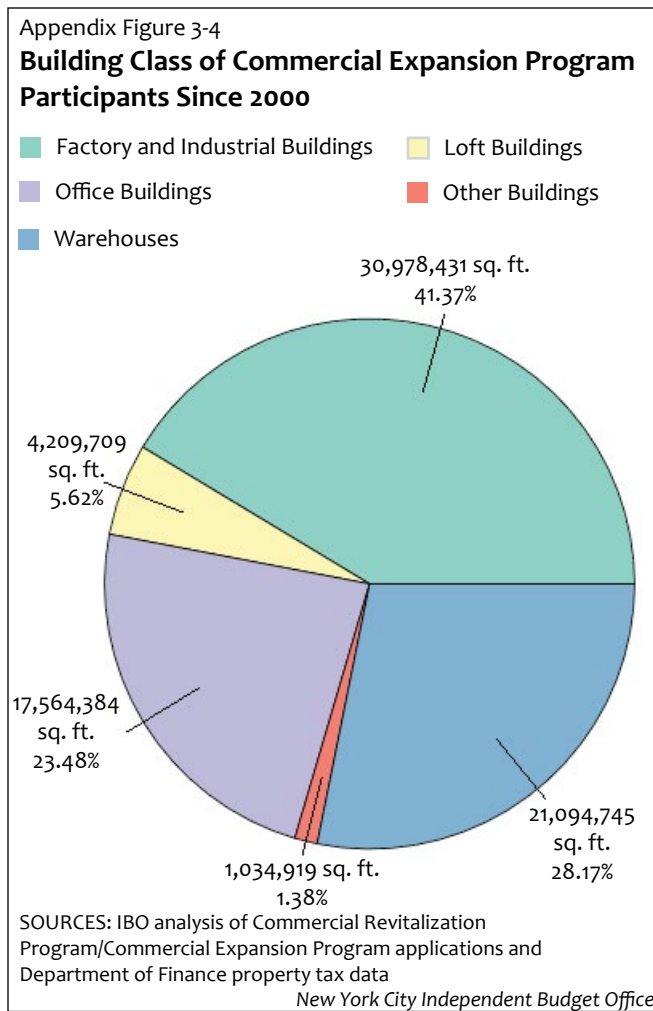
Appendix III
Eligibility and Participation Rates

Participation Rates



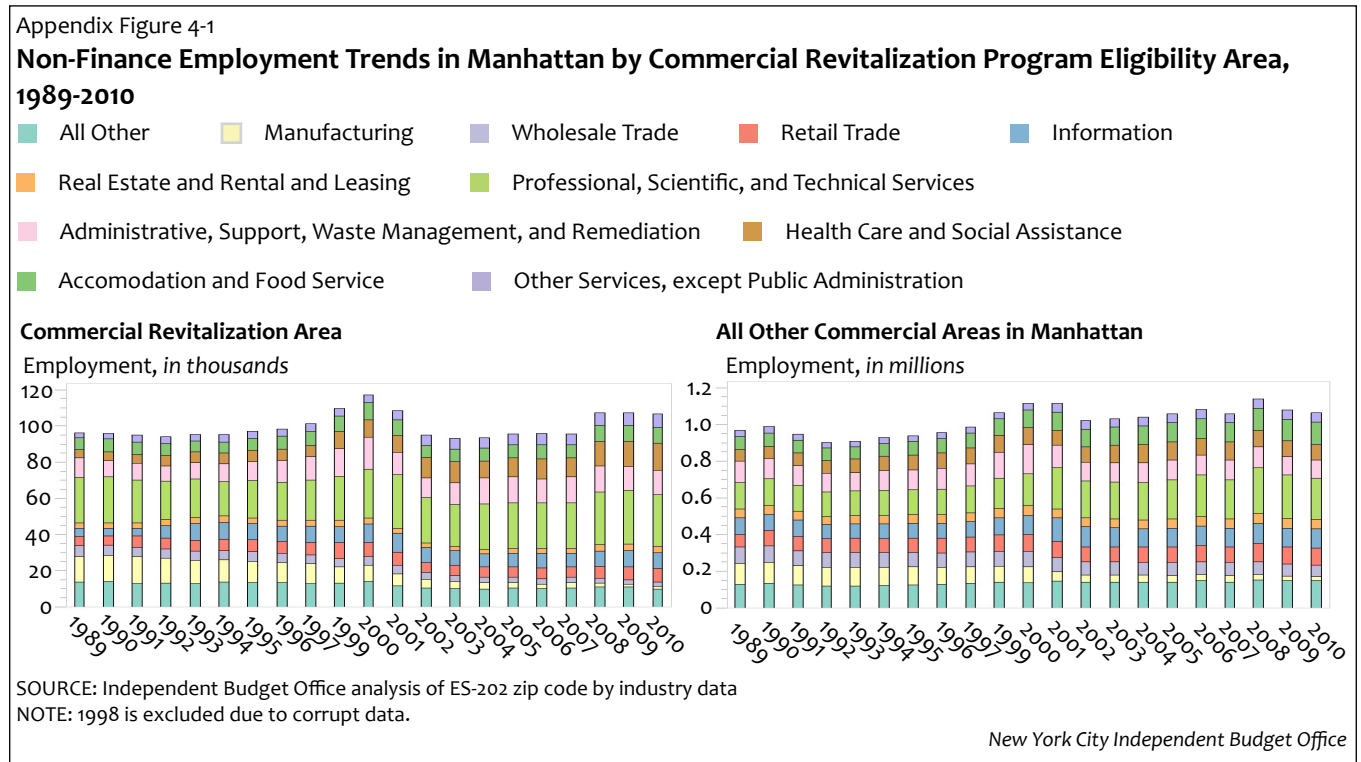
Building Class of Participating Buildings

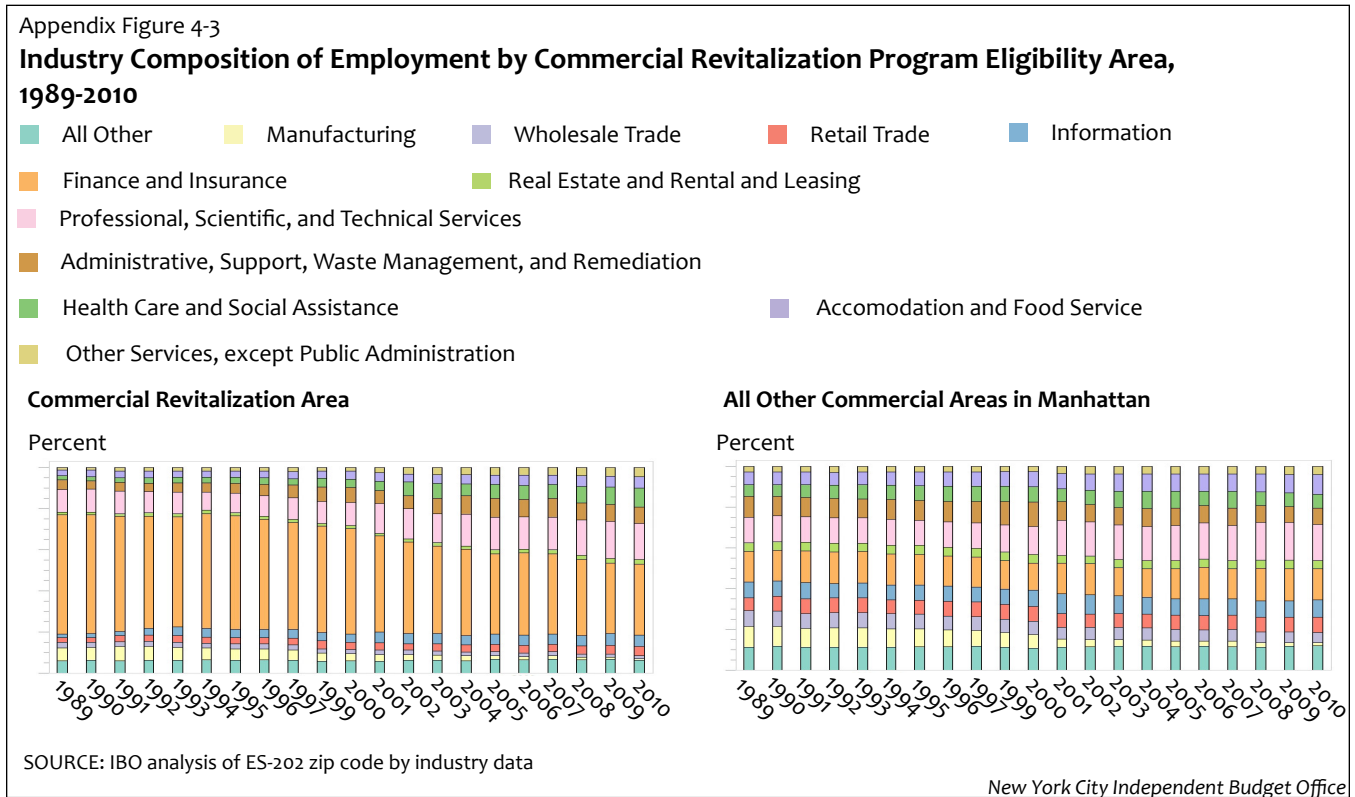
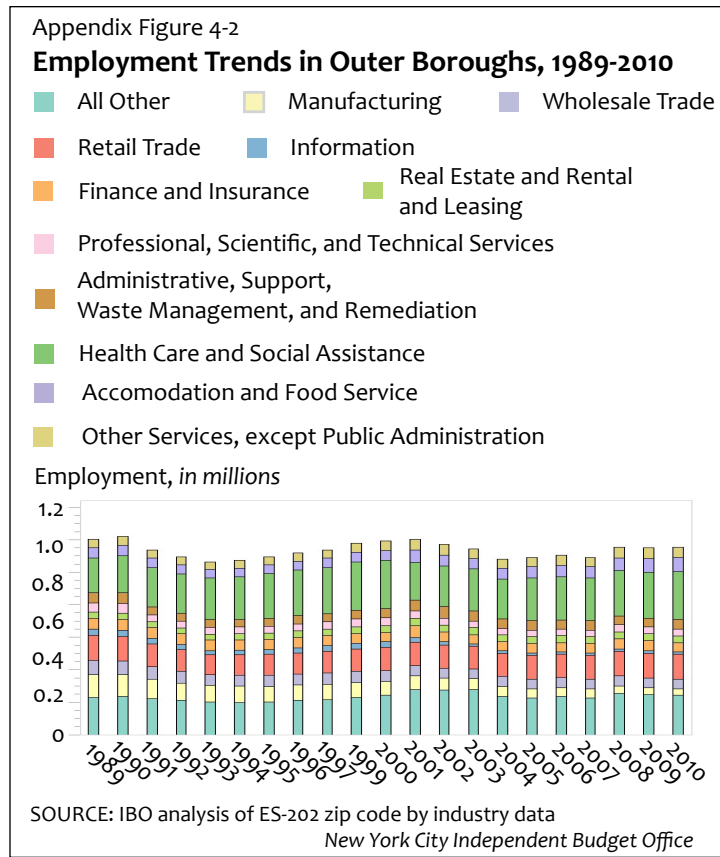




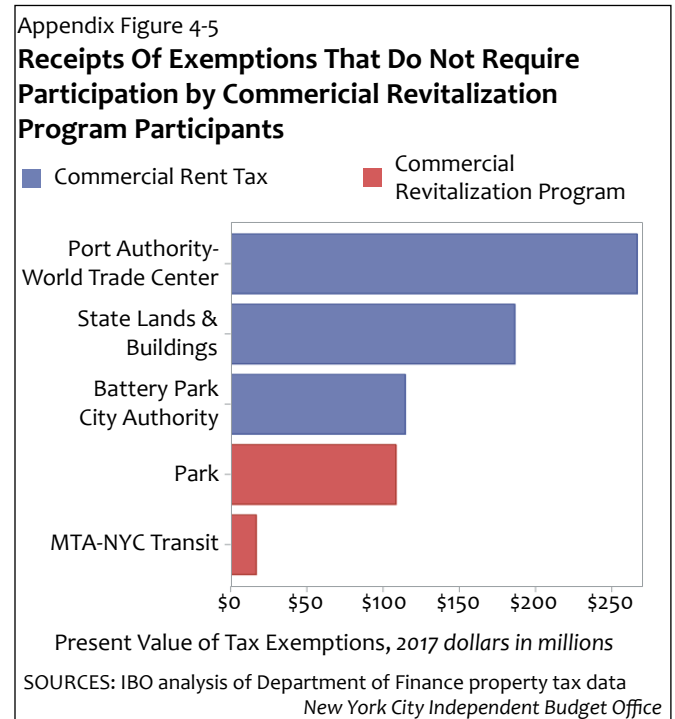
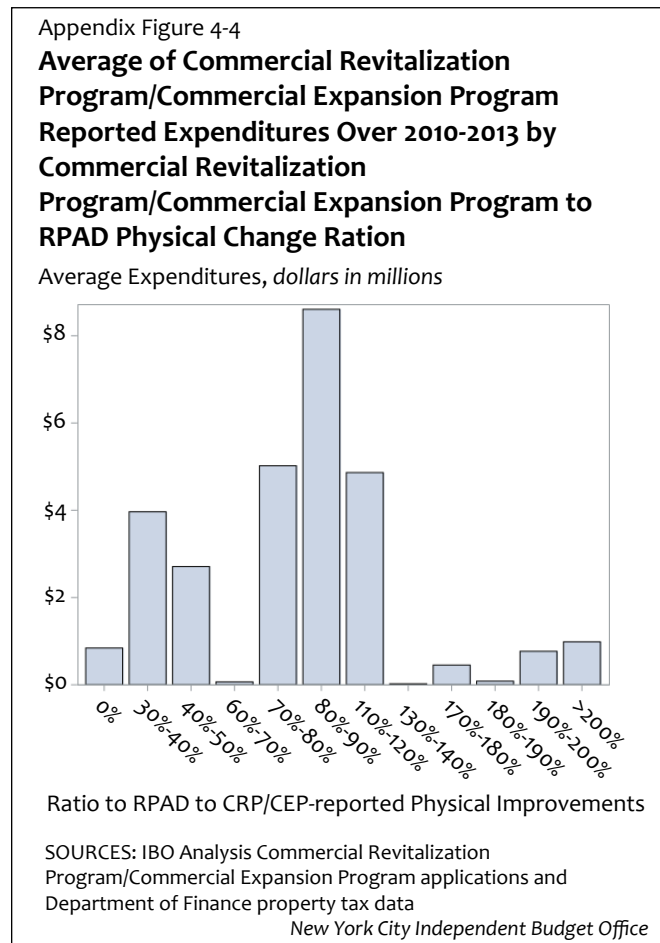
Appendix IV Supplemental Results

Additional Figures on Employment



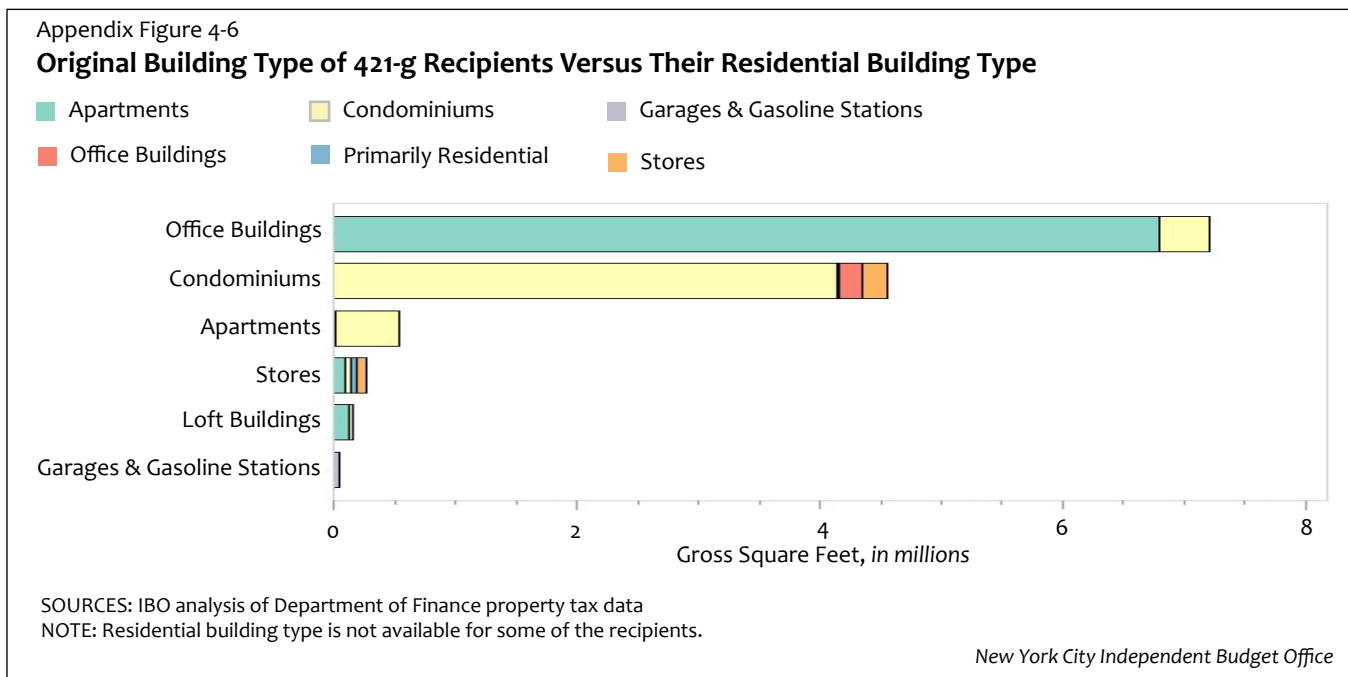


Additional Results on RPAD vs. CRP/CEP



Additional 421-g Results

The vertical axis shows the nonresidential building type of the 421-g recipients up to four years prior to first receipt of the 421-g property tax exemptions. All except a low percentage were originally apartments. The vertical axis shows gross square footage of each original building type, and each bar is color-coded to show the residential building type after receipt of 421-g exemptions. If no residential building type was ever observed after 421-g receipts, the current building type is shown by the colors. As this figure shows, some of the condo buildings were never turned residential and are currently stores or offices.



Appendix V Calculations

Appendix Table 5-1 Calculating the 2017 Present Value of Lost Revenue for \$100 of Unrecorded Physical Change in 1995						
Year (Col 1)	Effective Property Tax Rate for Class 4 Buildings (Col 2)	Change in Tax Base Net of Depreciation (Col 3)	Tax Revenue (Col 4)	(Col 5)	Present Value of Tax Revenue in 2017 Dollars (Col 6)	
1995	4.80%	\$100	\$4.80	2.9	\$14.00	
1996	4.70%	98	4.60	2.8	12.70	
1997	4.60%	95	4.40	2.7	11.60	
1998	4.60%	93	4.20	2.5	10.70	
1999	4.60%	90	4.20	2.4	10.00	
2000	4.50%	88	3.90	2.3	9.00	
2001	4.40%	85	3.70	2.2	8.20	
2002	4.40%	83	3.60	2.1	7.50	
2003	4.80%	80	3.80	2	7.60	
2004	5.10%	78	4.00	1.9	7.50	
2005	5.20%	75	3.90	1.8	7.00	
2006	5.10%	73	3.70	1.7	6.30	
2007	4.90%	70	3.50	1.6	5.60	
2008	4.50%	68	3.10	1.6	4.70	
2009	4.60%	65	3.00	1.5	4.40	
2010	4.70%	63	2.90	1.4	4.10	
2011	4.60%	60	2.80	1.3	3.70	
2012	4.60%	58	2.60	1.3	3.40	
2013	4.60%	55	2.60	1.2	3.10	
2014	4.60%	53	2.40	1.2	2.80	
2015	4.80%	50	2.40	1.1	2.70	
2016	4.80%	48	2.30	1.1	2.40	
2017	4.80%	45	2.10	1	2.10	
TOTAL			\$78.50		\$151.20	

SOURCE: IBO analysis
Notes on Calculation:
This table shows how each year's revenue of present value of tax revenue for \$100 of physical change is calculated.
Col 3: Using 2.5% depreciation rate and depreciating on the line, it is assumed that \$2.5 of the original physical change is lost in the tax base every year. This is appropriate for calculating what happens to \$100 on average.
Col 4: Tax revenue is the product of effective tax rate in each year (Col 2) and the tax base (Col 3).
Col 5: Assuming the discount rate $r = 5$ percent, this column shows the compounding factor used to calculate 2017 present values.
Col 6: This is the product of (Col 5) and (Col 4)

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Appendix Table 5-2
Percentage and Composition of Subsidies in Lower Manhattan Using Present Value of Total Subsidy and Cost of Occupation

PV Factor (r =5%)	Total Rent (PV)	Commercial Rent Tax (PV)	Total Cost in Lower Manhattan (PV)	Commercial			Lower Manhattan			Lower Manhattan Relocation Employment			Total Subsidy (PV)
				CRP Property Tax Abatement (PV)	Rent Tax Savings (PV)	Energy Program (PV)	Sales Tax Savings (PV)	Assistance Program (PV)	Relocation Employment Program (PV)				
1	300,000	11,700	311,700	25,000	11,700	4,725	1,109	15,000	57,534				
0.952	285,714	11,142	296,857	23,809	11,143	4,500	0	14,286	53,738				
0.907	272,108	10,612	282,721	22,676	10,612	4,286	0	13,605	51,179				
0.864	259,151	10,106	269,258	14,397	10,107	4,082	0	12,958	41,543				
0.823	246,811	9,625	256,436	6,856	9,626	3,887	0	12,341	32,709				
TOTAL	1363785.2	53187.6	1,416,973	92,738	53187.6	21,480	1,109	68,189	236,704				

SOURCE: IBO analysis
 NOTES: This table shows the Present Value (PV) of the example numbers shown section 6.1, using 5 percent discount rate for the first five years.
 The effective subsidy of 17 percent is calculated by dividing the PV of total subsidies (236704 in the last column) by the PV of Total Cost in Lower Manhattan (1,416,973). The sum of PV of CRP property
 tax abatements and CRP commercial rent tax savings is 145,926, and that is equal to 62 percent of PV of total subsidies.

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