Planning for Industrial Land and Industrial Jobs: An Evaluation of New York City's Industrial Business Zone Program

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PLANNING FOR INDUSTRIAL LAND AND INDUSTRIAL JOBS: AN EVALUATION OF NEW YORK CITY’S INDUSTRIAL BUSINESS ZONE PROGRAM

A Master’s Thesis Presented

by

JENNIFER M. DAVIS

Submitted to the Graduate School of the University of Massachusetts Amherst in partial fulfillment of the requirements for the degree of

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PLANNING FOR INDUSTRIAL LAND AND INDUSTRIAL JOBS: AN EVALUATION OF NEW YORK CITY’S INDUSTRIAL BUSINESS ZONE PROGRAM

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ABSTRACT

PLANNING FOR INDUSTRIAL LAND AND INDUSTRIAL JOBS: AN EVALUATION OF NEW YORK CITY’S INDUSTRIAL BUSINESS ZONE PROGRAM

MAY 2019

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In recent years, industrial preservation policies, which aim to preserve urban industrial activity and industrial employment often through the preservation of industrial land, have emerged as a flashpoint in cities across the country that have implemented these policies. While critics contend that industrial preservation policies amount to smokestack chasing in “post-industrial” cities like New York City, industrial preservationists argue that such policies help to preserve well-paying, middle-class jobs and thus represent a tool to mitigate rising income inequalities in cities. Despite considerable attention to these policies, minimal research has evaluated the effectiveness of industrial preservation policies as land use and economic development planning tools. This paper inserts itself into the debate surrounding the utility of industrial preservation policies by evaluating the effectiveness of New York City’s 2006 Industrial Business Zone (IBZ) program. Specifically, this paper uses propensity scoring to evaluate various measures of urban industrial activity in designated IBZs compared to a control group of similar areas. This paper finds that IBZs outperformed the control group in terms of better stemming industrial employment losses and industrial land decline. The control group, however, provided a more favorable climate to industrial business starts and performed about the same as IBZs in encouraging capital investments in industrial infrastructure. These findings suggest that the IBZ program yielded mixed results in its efforts to both attract and retain urban industry.
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CHAPTER 1
INTRODUCTION

Before James Galuppo, the founder and owner of the Manhattan-based Etna Tool & Die company, died at age 100 last year, he passed on one dying wish to his daughter, Flavia: do not sell the industrial building that for decades was home to his cherished tool and die headquarters (Traub, 2019). A world unto itself, Etna Tool & Die manufactured the mundane to the arcane: metal pipe-clamps used to unlock manholes that freckle the city’s street grid, devices designed to deter coin theft in the city’s payphones, and specialized parts to outfit Hells Angels motorcycles, among other novel creations (Dorn, 2018). Located on Bond Street in Manhattan’s Noho neighborhood, the Etna Tool & Die building now stands between two ultra-luxury condominiums and is located a stone’s throw away from the Hiratsuka-carved sidewalks that now blanket the neighborhood. As high-rise condominiums and glossy cafes have sprouted up across the former industrial neighborhood and in neighborhoods like it across New York City, Flavia, whose story was recently documented in a New York Times article, now faces what many industrial building owners before her have: continue industrial operations, often at significant city subsidy, or sell the industrial building for residential conversion with the promise of making millions (Dorn, 2018). Yet, Flavia’s adamancy, if not her financial capacity, to preserve her father’s tool and die trade, which her father once affectionately described as possessing a certain “ethic,” is the exception rather than the rule (Ferrara, 2012, “James Galuppo”).

In New York City and in other former industrial cities experiencing global economic restructuring across the country, industrial neighborhoods have transformed into ripe targets for commercial and residential redevelopment. In an oft-repeated trend, cities undergoing rapid growth in professional services (e.g. finance, insurance, and real estate) or the technology sector often
experience increased demand for luxury condominiums and high-end retail services to cater to the highly-paid urban elite (Sassen, 2004). Real estate developers and elected officials, eager to attract the highly-paid creative classes, often identify former industrial districts as the next frontier for real estate development (Brash, 2011). From there, urban redevelopment follows a familiar playbook; facilitated through rezoning of industrial neighborhoods, developers convert former industrial buildings into fashionable loft-style apartments or office space for technology companies in search of open office layouts (Yoon & Currid-Halkett, 2015).

This redevelopment pattern ultimately follows the logic of the “highest and best” use, or the notion that land should be dedicated to the use that commands the highest possible return-on-investment (Wolf-Powers, 2004). Under the principle of the highest-and-best use, residential or commercial users are often able to afford higher rents than industrial users (Wolf-Powers, 2004). This is the case since the majority of manufacturers’ expenditures are on labor and equipment, leaving them comparatively less money to spend on real estate space compared to non-industrial users (Friedman, 2009). Amidst industrial district redevelopment, manufacturers increasingly find themselves in a position where they must compete for limited space with non-industrial users that are easily able to outbid them in the process of securing rental space (San Francisco Planning Department, 2007). Inevitably, industrial landlords will award rental contracts to the highest-paying tenant; this process in turn facilitates the displacement of industrial businesses from central cities, who have increasingly turned toward suburban greenfields to set up shop.

In response to this urban redevelopment pattern, a range of industrial preservationists, including policymakers, community groups, labor unions, and urban planners, have highlighted one of the central plights of industrial users in urban centers: as industrial land is rezoned to support residential or commercial uses, these rezonings leave less space where industrial users can legally do business. For industrial preservationists, the displacement of industrial users from central cities
poses several concerns. First, the displacement of industrial uses threatens a critical source of middle-class jobs, as industrial businesses often provide high-wage jobs to people of color, immigrants, and people without a bachelor’s degree (Pratt Center for Community Development, 2015). For example, in 2017, average annual wages in the manufacturing sector was roughly $47,000 in Brooklyn. In comparison, wages in the retail sector were nearly two times lower, with employees in the retail trade sectors making roughly $28,000 on average. For advocates, industrial jobs therefore offer an important pathway for minorities and other marginalized communities to secure well-paying, middle-class jobs (Friedman, 2009).

Second, building on this argument, industrial preservationists argue that the displacement of industrial activities from central cities threatens to exacerbate rising income inequalities. Citing studies that indicate that the decline of manufacturing jobs is linked to a rise in income inequality, industrial preservationists contend that the displacement of industrial uses from central cities will exacerbate existing income inequalities (Friedman, 2009). The skills polarization hypothesis posits that economic restructuring has created a bifurcated labor market that leaves little room for middle-skilled/middle-class jobs (Autor & Dorn, 2013). Industrial preservationists contend that the displacement of industrial activities from central cities would further exacerbate skills polarization if current trends operate unchecked.

Third, industrial preservationists problematize the displacement of industrial activities from central cities in arguing that preserving a diverse urban industrial mix is intimately tied to the healthy functioning of an urban economy. For example, advocates have pointed out that industrial land often provides ideal sites to support research and development space for high-tech industries that could be a boon to the local economy and that the “return to manufacture-to-order or just-in-time modes of production associated with lean production can counter the perceived obsolescence of central city industrial facilities that have smaller footprints and multiple stories” (Green Leigh, 2014,
p. 327). In addition, industrial land also supports important urban service infrastructure, such as space for waste treatment facilities, warehouses, and space for private and public sector production, distribution, and repair (PDR) businesses, such as auto body shops (Green Leigh, 2013, p. 323). Taken together, industrial preservationists have argued that preserving industrial activities in central cities will help to mitigate rising income inequalities and help ensure a diverse urban industrial mix.

**Policy Response**

In response to industrial preservationists’ concerns, multiple cities facing a decline in urban industrial activity have adopted a series of policies, called “industrial preservation policies,” that aim to preserve industrial activities in central cities and stymie industrial business displacement. These industrial preservation policies vary widely in their implementation. For example, in 2004, the City of Baltimore responded to pressures to convert industrial land around its harbor to mixed-use housing and office space by establishing a maritime industrial zoning overlay district along the Baltimore waterfront, helping to protect industrial waterfront uses. In 2007, Seattle, facing a citywide decline in industrial land as the city’s technology scene boomed and former industrial land was rezoned to support high-end residential and commercial uses, changed its zoning code to limit non-industrial activities in areas of the city designated as industrial employment centers (Green Leigh & Hoelzel, 2012). Likewise, in 2009, San Francisco adopted its Eastern Neighborhoods Plan, which created production, distribution, and repair (PDR) protection zones and restricted most non-PDR uses within these zones. Notably, these policies all adopted a regulatory approach towards protecting urban industrial activities, changing their zoning code to protect urban industry.

New York City departed from the aforementioned industrial preservation policies by adopting a market-based approach to protecting urban industry. As part of New York City’s 2006 Industrial Business Zone program, NYC Mayor Michael Bloomberg initially designated Industrial
Business Zones (IBZs) in three of the five boroughs (the Bronx, Brooklyn, and Queens) and committed to not rezone IBZs for residential uses. The designated IBZs represented areas with predominantly industrial uses that the administration identified as being under threat from competing non-industrial uses. The administration then provided relocation tax credits and business support services to industrial businesses that remained or relocated to designated IBZs throughout the city. The Bloomberg administration positioned the IBZ program as one method to attract and retain industry and to stabilize industrial employment as escalating property values throughout the city threatened to displace the city’s remaining industrial users.

Although several cities have implemented industrial preservation policies in recent years, minimal research has focused on evaluating their actual performance as an economic development and land use planning tool. Data limitation issues have likely inhibited researchers from analyzing industrial preservation policies. Firm-level data at the geographic level that industrial land preservation programs typically cover (i.e. the Census Block level or lower) is confidential and thus limits opportunities for analyzing the impact of industrial land preservation policies on stabilizing industrial employment or industrial business displacement.

The lack of substantive research in this area matters because more cities are likely to start weighing whether or not to implement industrial preservation policies in their own cities, particularly in cities experiencing rapidly escalating housing prices as a result of technology sector growth (e.g. Nashville, TN and Austin, TX). Such cities will likely have to contend with questions around how to balance an increased demand for high-end residential and commercial development while leaving space for the critical work that industrial users perform and the middle-class jobs that industrial businesses tend to offer. This reckoning will be important, as it will determine the extent to which cities decide to embrace a diverse urban industrial mix and push back against rising income inequalities. As such, planners and economic development professionals need more information
around how effective industrial preservation policies actually have been at stabilizing industrial employment and industrial business displacement. Armed with this information, these stakeholders will be better poised to decide whether initiating an industrial preservation policy in their own city would represent a meaningful intervention to stem the continued decline of urban industrial activities from central cities.

This research paper aims to help fill this gap in the literature by evaluating the overall effectiveness of New York City's Industrial Business Zone program, asking: *to what extent did New York City's Industrial Business Zone program create a climate favorable to industrial businesses and industrial employment?* In doing so, this research paper aims to contribute to the wider conversation around the effectiveness of industrial preservation policies as economic development and land use planning tools.

**Research Objectives**

In examining the effectiveness of New York City’s Industrial Business Zone program, the following research objectives guide this paper:

1. Analyze how industrial preservation policies have impacted the amount of industrial land, industrial employment, industrial business registrations, and industrial building permit activity within designated IBZs compared to similar areas throughout New York City
2. Provide a sample methodology for evaluating industrial preservation policies that can be used and adapted by other planning professionals
3. Inform future industrial policy making by providing planners and economic development professionals with greater information around the effectiveness of a specific industrial preservation policy as a planning tool

**Research Questions**

In order to examine this overarching research question, this paper will examine how four units of analysis (industrial land, industrial employment, industrial business registrations, and industrial building permit activity) changed over time in IBZs compared to similar industrial areas in New York City since the start of the IBZ program in 2006. Examining the change in each of
the four units of analysis will provide greater insight into the industrial climate created under the
IBZ program and will therefore advance a better understanding of the program’s overall success.

The specific research questions guiding this paper are outlined below and are discussed in further
detail in Chapter 4.

1. How has the amount of industrial land in IBZs changed over time compared to similar
   industrial areas in New York City?
2. How has the amount of industrial employment in IBZs changed over time compared to
   similar industrial areas in New York City?
3. How has the amount of industrial business registrations in IBZs changed over time
   compared to similar industrial areas in New York City?
4. How has the amount of industrial building permit activity in IBZs changed over time
   compared to similar industrial areas in New York City?

Conclusion

As cities in high-growth, high-cost regions face pressure to rezone industrial land to higher-
value uses, the displacement of industrial activities from central cities poses several concerns
including the loss of critical urban service activities and the loss of well-paying, middle-class
industrial jobs. While planners and economic development professionals have attempted to arrest
industry’s continued decline by implementing industrial preservation policies in cities such as Seattle,
Portland, San Francisco, and New York City, minimal research has focused on evaluating the overall
effectiveness of industrial preservation policies. Seeking to fill this gap in the literature, this research
paper will evaluate one such industrial preservation policy—New York City’s Industrial Business
Zone program—with the goal of providing planners and economic development professionals with
more information surrounding the effectiveness of industrial preservation policies as a land use
planning tool. While findings from this paper cannot be extended to other cities beyond New York,
this paper nonetheless aims to advance current knowledge about industrial preservation policies and
calls on other researchers and practitioners to evaluate industrial preservation policies implemented
in other cities.
This paper is organized into several chapters. Chapter 1 is the introduction. Chapter 2 provides a literature review. Chapter 3 offers a brief history of manufacturing policy in New York City and a background on the Industrial Business Zone program. Chapter 4 outlines the methodology guiding this paper including the research questions and datasets used. Chapter 5 discusses the principal research findings. Chapter 6 offers several policy recommendations and discusses areas for future research. Chapter 6 is the conclusion.
CHAPTER 2
LITERATURE REVIEW

Previous studies in the literature have linked industrial displacement, or the forced closure or relocation of industrial businesses and their employees, to several factors including gentrification, smart growth policies, and permissive zoning regulations (Chapple, 2018; Curran, 2006; Green Leigh & Hoelzel, 2012; Lester & Hartley, 2014). In particular, past studies in literature have centered on addressing several key questions including 1) What factors lead to industrial displacement? and 2) What is the relationship between industrial land decline and economic development outcomes? This chapter will provide an overview of the various debates in the literature and will review how rezoning industrial land to support non-industrial uses impacts local labor markets (Chapple, 2014, 2018). Last, this chapter will provide an overview of areas of consensus in the literature and will conclude with a discussion of areas for future research.

What factors lead to industrial displacement?

Gentrification

In real estate markets experiencing rapidly appreciating property values, industrial businesses often face displacement pressures as developers convert industrial spaces to residential or commercial uses, which tend to yield a higher return-on-investment than industrial uses (Curran, 2006; Pratt Center for Community Development, 2015). The conversion of industrial space to residential or commercial space often reduces the already limited amount of space where industrial users can legally operate. As a result, this dynamic often bids up the cost of rental space, leaving many industrial users to either seek rental options in areas with more affordable rents or close their operations altogether (Pratt Center for Community Development, 2015).

These real estate pressures are combined with permissive municipal zoning laws that reward
the conversion of industrial land to residential uses, under the acknowledgement that non-industrial uses contribute more to the municipal tax base. For example, in New York City, unused manufacturing space can be converted to residential uses if the property has not been used for manufacturing purposes for at least three years (Curran, 2006, p. 1438). This policy in turn encourages speculative real estate practices, in which landlords can “warehouse” industrial buildings, or keep them vacant, under the assumption that the area will be rezoned to support more fiscally lucrative uses (Pratt Center for Community Development, 2015). Permissive building code enforcement likewise contributes to the overall decline in industrial activity in central cities. Building departments that fail to crack down on illegal conversions of industrial spaces to residential or commercial uses send the signal that cities are not committed to retaining industrial uses.

With these dynamics at play, previous studies in the literature have adopted both qualitative and empirical approaches to measure how gentrification impacts industrial displacement. For example, Curran (2006) conducts a qualitative study to understand factors that propelled the displacement of small-scale manufacturers in Williamsburg, Brooklyn in the early 2000s. Curran uses Dun and Bradstreet Regional Business Directory data to record manufacturing businesses that closed or moved out of Williamsburg between 1998 and 2002, a time period that Curran’s informant interviews indicated represented the peak period of industrial displacement in the neighborhood. After identifying displaced businesses, Curran conducts stakeholder interviews with current and displaced business owners to better understand factors that could lead or led to their displacement from the neighborhood. Based on these stakeholder interviews, Curran finds that as industrial buildings were converted to high-end residential lofts, multiple factors fueled the relocation or closure of small-scale manufacturers in the neighborhood. Manufacturers, particularly those undergoing expansion, were no longer able to find sufficiently affordable, large spaces to meet their expansion needs. In other instances, displaced businesses reported that they decided to move out of
the neighborhood or close shop in the face of landlord intimidation tactics. As informants shared, it was common for landlords of industrial buildings to approach industrial tenants with large lease buyout offers or to offer unfavorable month-long leases. Taken together, Curran argues that these dynamics further limited the supply of industrial space in Williamsburg and created an increasingly anti-industrial climate.

Other studies have adopted an empirical approach to examine the interplay between gentrification and industrial business displacement. For example, Lester and Hartley (2014) ask whether gentrifying areas experience greater employment and new establishment growth compared to non-gentrifying areas. To examine this question, they construct an ordinary least square regression model to examine how gentrification impacts net employment change at businesses located in gentrifying Census Tracts compared to a comparison group of similar, non-gentrifying Census Tracts in a sample of 20 large cities across the United States. The authors use the National Establishment Time Series (NETS) database to examine employment change and new establishment growth among businesses located within each respective Census Tract group between 1990 and 2008.

Lester and Hartley (2014) find that net employment growth was higher in gentrifying compared to non-gentrifying Census Tracts, but that jobs in the service sector, such as retail or restaurant jobs, replaced jobs in goods-producing or goods-handling sectors. In addition, the authors find that both manufacturing jobs and wholesale establishments declined more in gentrifying areas compared to non-gentrifying areas, supporting the authors’ claim that “the land price speculation that accompanies gentrification may result in the displacement of viable (or marginally viable) manufacturing firms as building owners evict industrial tenants in order to sell their properties for an alternative use, namely residential or commercial conversion” (p. 88). Taken together, this finding suggests that gentrification pressures may induce the displacement of industrial firms.
While offering a better understanding of how gentrification can exacerbate industrial business displacement pressures, these studies do not explore how industrial displacement pressures may vary according to different industrial firm characteristics. For example, are industrial businesses of a certain size better able to withstand displacement pressures? Does the specific specialty of an industrial business influence its ability to withstand displacement pressures? Do industrial businesses located in cities with powerful pro-industrial labor unions or community-based groups face more modest displacement pressures?

A case study by Giloth and Betancur (1988) helps to illuminate a few answers to these questions. In their case study of two industrial districts (River North and Goose Island/Clybourne) in Chicago’s Super Loop between 1978 and 1985, Giloth and Betancur examine how industrial business displacement varied according to firm characteristics. The authors find that smaller firms, or firms with fewer than 50 employees, more often moved out of industrial districts due to displacement pressures, while larger firms relocated more often due to reasons unrelated to real estate pressures, such as space requirements. They also find that specific industries, including printing and publishing industries, experienced higher rates of displacement in both of the industrial districts. Notably, the authors find that industrial community organizing can serve as a bulwark against industrial displacement pressures. Specifically, the authors find that in Goose Island/Clybourne, active participation in industrial councils reduced overall industrial displacement, as councils mobilized against loft conversions and advocated for zoning legislation to protect manufacturing areas. Giloth and Betancur (1988) conclude that this finding suggests that it is possible to avoid pitting real estate interests against industrial retention interests, but that “doing so requires tough-minded political choices, creative land use planning, and effective community organizing” (p. 280).
While Giloth and Betancur’s case study contributes valuable insight into the relationship between specific firm characteristics and industrial displacement, their findings are limited to a case study of two industrial districts in Chicago’s Super Loop between 1978 and 1985. While minimal recent research has focused on examining how industrial firm characteristics interface with industrial displacement pressures, this line of research could provide useful insight for future policy action. Armed with more information about the specific needs of industrial businesses, policy interventions could be targeted towards industrial businesses that may face a comparatively higher threat of displacement than others based on their specific firm characteristics.

Smart Growth Policies

While several studies in the literature have examined how gentrification drives industrial displacement, other scholars have attempted to tease out how smart growth policies have fueled industrial displacement through land use policies that support the conversion of industrial land to other uses. For example, Green Leigh and Hoelzel (2012) examine how smart growth policies, which encourage mixed-use, transit-oriented, and infill development through the conversion of often inexpensive industrial land to other uses, fail to consider the economic development implications of doing so on the industrial sector. In their study, Green Leigh and Hoelzel review industrial land preservation policies from fourteen cities across the United States in addition to ten smart growth publications. From their literature review, the authors find that industrial land is declining in cities with escalating property values and that industrial development is often “pitted against mixed-use, retail, commercial, office, high-technology, and residential development” as cities shift to a service-based economy (Green Leigh & Hoelzel, 2012, p. 90).

In addition, the authors find that none of the smart growth publications that they reviewed examined the role of industrial land in supporting critical public services or offered policy guidance
on “ensuring a sustainable mix of industrial jobs” (Green Leigh & Hoelzel, 2012, p. 95). They argue that this elision reveals smart growth’s “blind side” insofar as such policies are often divorced from broader economic development considerations around how industrial activity contributes to the overall healthy functioning of an urban economy and a diverse labor market. The authors conclude that “land use planning and local economic development have shared interests, which, if recognized, would help to dismantle the silos between smart growth planning and urban industrial planning” (Green Leigh & Hoelzel, 2012, p. 90).

**Permissive Zoning**

In addition to examining how gentrification pressures and smart growth policies contribute to industrial displacement pressures, other studies examine how permissive zoning regulations facilitate real estate speculation and in turn, industrial displacement. For example, Wolf-Powers (2004) examines how permissive zoning regulations facilitated “opportunistic development and industrial displacement” in a case study of two industrial neighborhoods in New York City—Greenpoint-Williamsburg in Brooklyn and Long Island City in Queens—in the early 1990s (p. 379). In her case study, Wolf-Powers leverages notes from public hearings, official documents, and interviews with business owners and community activists, to examine how permissive zoning regulations accelerated industrial displacement in both neighborhoods, arguing that “ambiguously defined and poorly enforced land use regulations contributed to property speculation and the displacement of firms in what had been healthy light industrial districts” (p. 380). Because non-industrial uses could locate as-of-right in both neighborhoods, Wolf-Power explains how this allowed non-industrial users to bypass the city’s Uniform Land Use Review Procedure (ULURP). By bypassing the city’s ULURP process, this stripped planners and members of the public of the opportunity to voice concerns about the potential adverse side effects associated with allowing non-
industrial uses in predominantly industrial areas. In this climate, Wolf-Powers finds that landlords, in pursuit of the highest-paying tenants, engaged in a series of intimidation tactics. Such tactics included steep rental hikes, the provision of month-to-month leases, or eviction. Taken together, Wolf-Powers’ study suggests that permissive zoning regulations and landlord intimidation tactics can both contribute to industrial displacement pressures.

What is the relationship between industrial land decline and economic development outcomes?

Industrial Land and Industrial Employment Growth

In addition to examining the various factors that influence industrial business displacement, other studies have attempted to tease out the relationship between the decline of urban industrial land and economic development outcomes, such as their impact on industrial firm expansion or industrial wages (Chapple, 2018; Lester et al., 2013). For example, Lester et al. (2013) explore factors that influence land use conversion among industrial parcels located in Mecklenburg County, North Carolina and Cook County, Illinois in order to create an industrial land vulnerability index. In their analysis, Lester et al. (2013) construct a multivariate regression model to understand how location dynamics (e.g. distance of the parcel from the central business district), real estate dynamics (e.g. land values of properties surrounding the parcel), broader industry and company dynamics (e.g. competitiveness of the industrial business located on the parcel), and local regulation dynamics (e.g. industrial land preservation policies) impact the conversion of the parcel to non-industrial uses. In addition, the authors leverage establishment-level data from the National Establishment Time Series (NETS) database to examine employment patterns among businesses located on parcels in their study areas.

Lester et al. find that parcels that are home to industrial businesses experiencing positive net
employment gains faced lower risks of land use conversion. Speaking to this finding, the authors suggest that “this indicates that relatively healthy manufacturing companies that are adding jobs are able to meet potentially rising rents and withstand pressure to convert” (Lester et al., 2013, p. 301). While this finding suggests that parcels with expanding industrial businesses face a lower risk of converting to a non-industrial use, Lester et al.’s study stops short of examining the reverse scenario. That is, to what extent does zoning influence industrial firm expansion? Chapple's (2014) study of business relocation dynamics and industrial firm expansion sheds light on this inquiry.

**Industrial Land and Industrial Firm Expansion**

In recognition of the growing debate in the literature surrounding the relative merits and drawbacks of rezoning urban industrial land, Chapple (2014) examines the importance of industrial zoning in supporting the viability of urban industrial businesses. Specifically, she examines how zoning impacts industrial firm expansion among businesses located in four cities in the San Francisco Bay Area (Berkeley, Emeryville, Oakland, and Richmond). In her analysis, Chapple (2014) relies on data from the NETS database, which provides establishment-level employment data, to examine net employment change at industrial businesses between 1995 and 2008 in the four sample cities. The author then links this data to tax parcel data, facilitating an examination of how net employment change at a given industrial firm interfaces with the zoning of the parcel that the business is located on. From there, she conducts an ordinary least square regression model to examine the relationship between business expansion and zoning, controlling for specific firm characteristics (e.g. initial firm employment, firm sales, firm age), building characteristics (e.g. building age, building square footage), industry, and firm location.

Chapple (2014) finds that industrial firm expansion is most strongly associated with the size of the industrial firm and that the availability of industrially-zoned land and building size are also
positively and significantly associated with industrial firm expansion. The author explains that buildings located in industrial zones might be more likely to house “flex” spaces that enable the expansion of firms. Chapple (2014) concludes by advocating for stronger linkages between future land use planning and economic development: “If industrially-zoned land is important to job creation via firm expansion, then it is important to link land use planning to a regional economic strategy” (p. 311).

While Chapple (2014) flags that findings from her analysis are limited to the East Bay study area, she also argues that her findings extend to other strong-market cities, such as New York City or Portland, that face similar pressures to rezone urban industrial land to residential or commercial uses. Her analysis therefore calls for future research examining the relationship between industrial zoning and industrial business dynamics.

Industrial Land and Industrial Wages

Other studies in the literature have attempted to further elucidate the relationship between land use planning and economic development outcomes in examining the relationship between industrial land use conversion and wages. For example, Chapple (2018) asks a) what factors explain the conversion of land from non-sales-taxable generating uses to sales-tax-generating uses (such as retail uses) and b) how does a jurisdiction’s dependence on sales tax revenue predict wage decline in the local labor market? To answer these questions, Chapple (2018) constructs a multivariate regression model, examining how various factors such as regional economic strength, local industry structure, fiscal structure, urban form, and land use conversion predict wages at the Census Tract level on roughly 1.2 million parcels in California between 2007 and 2013 (p. 299). Findings from her analysis indicate that the degree of municipal reliance on sales tax revenue and land use conversion both significantly predict wage decline; land use conversion is positively and significantly associated
with wage decline. Chapple (2018) frames her findings as an example of how land use conversion can yield adverse impacts on the local labor market. Given that sales-tax-revenue generating uses tend to be in the lower-paying retail sector, Chapple concludes that this finding suggests that “local jurisdictions, which presumably are encouraging the conversion of land, may be trading off higher tax revenues for lower wages” (Chapple, 2018, p. 299).

While Chapple’s (2018) findings do not focus specific attention on how the conversion of land to sales-tax-revenue-generating uses impact wages in the industrial sector, her study is nonetheless relevant to the industrial sector. As this chapter has noted, industrial businesses face acute displacement pressures, particularly as residential and commercial uses, threaten to displace industrial uses. Amidst these dynamics, Chapple’s (2018) findings raise the question of how local labor market wages will fluctuate in cities where industrial land is being converted to retail or commercial uses at a rapid pace. Her findings therefore add value to the existing literature examining the relationship between land use planning and economic development outcomes; they highlight a potential pitfall for cities pursuing land use planning policies that revolve around converting relatively inexpensive industrial land to higher and better uses, but that tend to offer lower-wage jobs.

Conclusion

This chapter has provided an overview of some of the principal debates in the literature on industrial displacement and industrial gentrification. Previous studies in the literature have identified a number of phenomena that influence industrial displacement–gentrification pressures, smart growth policies, and permissive zoning policies chief among them. Although these three factors exacerbate industrial displacement pressures, this literature review also reveals that these forces do not operate unchecked. For example, Giloth and Betancur (1988) find that the active participation of industrial councils in mobilizing against residential loft conversion in Chicago helped to mitigate
industrial displacement pressures, suggesting that active community organizing might serve as a bulwark against industrial displacement.

Despite the valuable contributions of these studies, critical gaps remain. While considerable scholarship has focused on examining a) factors that contribute to industrial displacement and b) how the decline in urban industrial land impacts local labor markets, minimal research has focused on examining the effectiveness of different industrial preservation policies on local labor markets. That is, how effective are different industrial land preservation policies at stabilizing industrial employment and reducing industrial business displacement? For example, are there particular approaches to industrial preservation that are more effective at stemming the continued decline of industrial land or industrial employment than others?

This gap in the literature is an important line for future research, particularly given that several cities have already started to adopt a variety of industrial preservation policies despite the minimal evidence of their effectiveness (Green Leigh & Hoelzel, 2012). Cities experiencing rapidly increasing property values and facing steep pressure to convert limited industrial land to higher and better uses would benefit from an empirical investigation examining the effectiveness of different types of industrial preservation policies in particular. Such cities could then assess how different industrial preservation programs might be best suited for implementation in their own cities.

Finally, another area for future research includes examining the extent to which industrial preservation policies are able to balance economic development objectives with housing production objectives. As this chapter has noted, cities experiencing rapidly increasing property values often turn to industrial land for future housing development or as places to locate homeless shelters (Najar, 2012). As a result, cities must increasingly choose between prioritizing industry or meeting housing production objectives, both of which warrant equal attention. For example, Lester et al. (2013) questions, “Should [planners] enact industrial land preservation policies to protect viable
manufacturers that provide good jobs even if it exacerbates the problem of affordable housing and causes cities to forego growth in other sectors?” (p. 295). While some argue that choosing between industry and housing does not have to be an either-or proposition, cities would benefit from an empirical investigation examining how industrial preservation policies impact housing production (Pratt Center for Community Development, 2016).

This research paper attempts to address some of these gaps in the literature in evaluating how one industrial preservation policy, New York City’s 2006 Industrial Business Zone program, created a climate favorable to industrial businesses and industrial employment. In doing so, it provides planners and practitioners with more information surrounding industrial preservation policies as a planning tool. The next chapter will provide an overview of industrial and manufacturing policy in New York City in the years leading up to the start of the Industrial Business Zone program.
CHAPTER 3
MANUFACTURING POLICY IN NEW YORK CITY

The Rise and Decline of Manufacturing in New York City

In the first half of the twentieth century, manufacturing reigned supreme in New York City. The largest urban manufacturing center in the nation, it employed almost one million manufacturing workers at its height in the post-war period (New York City Council, 2014, p. 7). Reflecting a city of makers, urban factories freckled the urban landscape, with different neighborhoods often specializing in their own craft. Factories in Brooklyn's Williamsburg specialized in chewing gum, pickled vegetables, and roasted coffee, while factories lining the streets of Clinton Hill and Bedford Stuyvesant manufactured leather goods such as boots and trunks (Metcalf, 2016). Factories in Midtown Manhattan and the Lower East Side were home to a high concentration of women’s wear factories, employing roughly half of all women’s wear garment workers in the United States at the turn of the century (Green, 2005, p. 28).

The city supplied the ideal environment for a flourishing urban manufacturing sector in the early twentieth century for several reasons. The ports that lined the East and Hudson River waterfronts linked New York City with other regional and international ports, and the 34th Street train yard in Manhattan provided the needed infrastructure to support goods flowing into and out of the city. The large supply of immigrant workers living in the Lower East Side and Tenderloin neighborhoods likewise contributed to the manufacturing industry’s rise. Immigrants provided a flexible, cheap source of labor needed to haul goods arriving at the city’s ports or to operate machinery in the city’s numerous garment factories (Shell, 2015). The city's density also provided an environment favorable to constant innovation in the manufacturing sector, as it facilitated frequent face-to-face contact between suppliers and buyers, enabling the development of specialized products. Manufacturing companies located close to one another also benefited from shared labor
pools and interfirm idea sharing, further facilitating the development of innovative manufacturing products (Friedman, 2009).

By the early 1920s, however, signs began to emerge that the manufacturing industry had reached a crescendo, facilitated in part due to recent zoning changes that relegated manufacturing and industrial uses to the outer boroughs. In 1916, New York City passed the nation’s first zoning law, which enabled the New York City Board of Estimates to regulate the bulk, height, and use of buildings (Tauranac, 2014). Prior to the 1916 Zoning Resolution, manufacturing firms were allowed to locate anywhere in the city, which placed strain on at times incompatible land uses located in close proximity to one another (New York City Council, 2014). The 1916 Zoning Resolution aimed to ameliorate incompatibility between different land uses by dividing New York City into three zones including a residential, business, and unrestricted zone. Residential zones were designed to exclusively support residential uses with some institutions, such as churches and schools, mixed within their borders. While business zones were designed to support white-collar trades, unrestricted zones were designed to be the domain of heavy manufacturing or other uses that produced noxious odors or loud noises.

One of the zoning resolution’s lasting legacies is that it largely relegated manufacturing and industrial uses outside of Manhattan. Under the city’s new zoning laws, manufacturing and industrial uses were excluded from central business districts, which covered the majority of Manhattan (New York City Department of City Planning, 1916). As a result, manufacturing and industrial uses started to migrate out of Manhattan and instead sprouted up along freight lines and along the Bronx, Brooklyn, and Queens waterfront (New York City Council, 2014).

The 1916 Zoning Resolution worked in tandem with office speculation to further expel urban manufacturing activity from Manhattan to the outer boroughs (Shell, 2015). In the pre-war period, public officials and the city’s real estate elite, envisioning the economic future of the city as
an office-based one, began to invest more in office-based rather than manufacturing-based infrastructure. For example, public officials and the real estate elites’ preference for office construction received official endorsement after the Russell Sage Foundation published its influential *Regional Plan of New York and Its Environs* report in 1929. Bankrolled by several of the city’s leading financial institutions, the *Regional Plan of New York and Its Environs* advocated that Manhattan be rezoned and that most freight-handling facilities and manufacturing activity be expelled from the city center. The report recommended that new office and residential buildings be constructed along the former industrial waterfront in Manhattan (Shell, 2015). This preference for investing in the city’s office-based sectors further propelled manufacturing activity out of Manhattan, as industries migrated to the outer boroughs or outside of the city altogether in search of flexible office space (Green, 2005).

While these zoning changes began to erode the city’s urban manufacturing base, economic restructuring in the post-war period dealt an even heavier blow to New York City’s manufacturing industry. Following national trends towards suburbanization and the offshoring of manufacturing jobs to lower-wage regions in the world, manufacturing employment plummeted in the post-war period. Between 1958 and 2000, New York City lost nearly 700,000 manufacturing jobs (The Pratt Institute Center for Community and Environmental Development, 2001, p. 9). As factories and warehouses closed across the city, employment in the finance, insurance, and real estate (FIRE) sectors boomed. In the span of a few decades, New York City transformed into a global command center home to financial and investment company headquarters, bringing service sector jobs with them (Sassen, 1991). Global financial and investment companies further fueled employment in the service sector, as these companies consumed high-end services, such as legal, accounting, and advertising services, to run their operations. Taken together, these dynamics facilitated the
restructuring of the New York City economy away from manufacturing and towards the high-end services sectors.

As manufacturing employment began to dip, and under the recognition that the manufacturing industry faced a perilous future, the city took one of its first substantive steps to interrupt the manufacturing industry’s continued decline in the 1980s. Established in 1980, the In-Place Industrial Park (IPIP) Program provided business support services to manufacturing and industrial companies located within several designated geographic areas throughout the city. Following extensive outreach to industrial businesses, the NYC Economic Development Corporation and the NYC Department of Small Business Services partnered with local development corporations to oversee industrial and manufacturing business operations located within designated IPIPs. In addition, local development corporations were also tasked with “monitor[ing] industrial real estate available for sale or lease, and [to] encourage its productive industrial use by helping clients access as-of-right public incentives” (The City of New York, 2005, p. 27). The IPIP Program therefore represented one of the city’s first meaningful interventions to provide real estate support services to industrial businesses that had started to face displacement pressures often in gentrifying neighborhoods.

Though the IPIP Program represented a valiant attempt to support the city’s manufacturing base, the city’s updated zoning code, codified in the 1961 Zoning Resolution, ultimately operated at odds with the IPIP Program’s objectives. Under the 1961 Zoning Resolution, the city replaced the “unrestricted” zones created under the city’s 1916 Zoning Resolution with three categories of manufacturing districts. The three manufacturing districts, called M1, M2, and M3 zones, were designed to reflect different levels of industrial intensity. M1 zones were designated to support light industrial uses, such as repair shops and storage facilities, whereas M2 zones allowed higher noises and vibration levels and were home to municipal facilities such as passenger ship terminals. Last, M3
zones were reserved for industrial uses that produced highly hazardous or noxious smells (New York City Department of City Planning, n.d. “Manufacturing Districts Overview”).

One of the unintended consequences of these newly established manufacturing districts is that these districts enabled many non-industrial users, such as commercial or residential users, to locate as-of-right within manufacturing zones (New York City Council, 2014). For example, M1 districts permitted non-industrial uses such as community facilities, hotels, retail stores less than 10,000 square feet, office buildings, and storage facilities, to locate as-of-right within their borders. Likewise, M2 and M3 zones permitted non-industrial uses such as office buildings and most kinds of retail with less than 10,000 square feet. This zoning framework enabled non-industrial uses, which are often able to afford higher rents than industrial users, to compete for limited space in manufacturing districts all without requiring a special permit or community input (Pratt Center for Community Development, 2008).

Despite the establishment of the IPIP Program, manufacturing employment continued on a downward spiral throughout the 1980s and 1990s, while employment in the corporate and consumer services sectors continued to multiply. In response, elected officials, planners, and the city’s real estate elite pursued an urban redevelopment agenda that focused on investing in projects that would increase the city’s supply of office space in industrial neighborhoods (Fainstein & Fainstein, 1987). For example, the Port Authority of New York and New Jersey’s plan to redevelop Hunters Points, an industrial section of Long Island City in Queens, for office space in the mid-1980s, is emblematic of this approach. Under this plan, the Port Authority argued that Hunters Point would provide an ideal location for offices among businesses priced out of Manhattan. Scholars and activists, however, claimed that the actual demand for new office space was tenuous at best and that redeveloping Hunters Point for office uses would place heightened real estate pressure on manufacturing companies already located there (Fainstein & Fainstein, 1987). This urban redevelopment agenda,
therefore, attempted to prime the city for growth in white-collar industries in the same moment that it further marginalized the city’s industrial sector.

This urban redevelopment agenda persisted through the early 2000s and arguably reached a crescendo under the Bloomberg administration. In 2001, a year before Bloomberg entered office, New York Senator Chuck Schumer published a report called *Preparing for the Future: A Commercial Development Strategy for New York City*, that further lent credence to the notion that the city lacked sufficient office space and that former industrial neighborhoods would represent ideal sites for future redevelopment (McCormick, 2015). The report, which was written by coalition of 35 academics, public officials, and corporate executives, lamented the shortage of office space in Manhattan and argued that the current shortage of office space placed New York City at a competitive disadvantage with other cities. As a remedy, the report called for the production of an additional 60 million square feet of office space by 2020, identifying Downtown Brooklyn, Long Island City, and the far West Side in Manhattan—all neighborhoods with relatively thriving industrial activity—as ideal sites for future office space expansion (Bagli, 2001).

Mayor Michael Bloomberg, whose reputation for favoring high-end residential and commercial development precedes him, did not need a second telling. Arguably taking the Schumer study too much to heart, the Bloomberg administration rezoned large swaths of New York City to support high-end residential and office development to the detriment of manufacturing uses. In 2002, when Bloomberg entered office, there were roughly 12,500 acres of manufacturing land throughout the city where manufacturing businesses could legally operate. Four years later, the city had lost roughly 20 percent of its manufacturing land due to rezonings greenlighted by the Bloomberg administration (Pratt Center for Community Development, 2008). In fact, none of the 95 rezonings implemented under the Bloomberg administration added additional space for manufacturing zoning (Pratt Center for Community Development, 2008). The rezonings largely
took place in heavily manufacturing areas including Long Island City, West Chelsea, and Williamsburg-Greenpoint. Ironically, the Manufacturing Land Use and Zoning Initiative had identified these three neighborhoods as having the highest density of manufacturing workers in 2001, sending the firm signal that the Bloomberg administration did not prioritize protecting industrial employment (New York City Council, 2014).

Ultimately, these rezonings aligned with the Bloomberg administration’s property-led economic development strategy, in which the administration prioritized increasing the supply of office space for professional services rather than providing direct tax incentives to the FIRE industries that the administration sought to attract (Lander & Wolf-Powers, 2004). Daniel Doctoroff, a former businessman and then the Deputy Mayor for Economic Development and Rebuilding, headed up this strategy by rezoning manufacturing areas to residential or office uses and upzoning business districts to allow for more office space. The administration packaged this approach as part of an overall strategy to maintain the city’s leading position in the FIRE industry following several events that threatened the city’s previous dominance in these sectors: the decline of the once-dominant securities industry in the 1990s and the 9/11 terrorist attacks on the World Trade Center (Lander & Wolf-Powers, 2004).

In addition, the rezonings in many ways tied into the Bloomberg’s administration’s pro-growth agenda, which prioritized return-on-investment over questions of equity. Scholar Julian Brash has described Bloomberg’s approach to urban development as the “luxury city approach,” in which the Bloomberg administration employed a “logic of investment, whereby [the administration] would select and pursue investments (particular development projects) in ‘the product’ (the city as an urban environment) that would ultimately lead to increased ‘profit’ (incremental tax revenue)” (Brash, 2011, p. 201). This characterization of Bloomberg’s approach to urban redevelopment stems from his renowned comment that “if New York City is a business, it isn’t a Wal-Mart… It’s a high-
end product, maybe even a luxury product. New York offers tremendous value, but only for those companies able to capitalize on it” (Friedman, 2009, p. 25). For opponents of the Bloomberg administration, this statement cemented the view that increasing residential and commercial development throughout the city reflected the city’s manifest destiny.

The Bloomberg administration’s rezonings were met with some criticism. Industrial activists, labor unions, and community boards began to organize in support of urban manufacturers and highlight the critical role that industrial and manufacturing companies play in the New York City economy (Crean, 2011). As industrial preservationists highlighted, industrial bakeries provide fresh products for the city’s world-class restaurants, while garment and furniture manufacturers produce costumes and props for the multi-billion-dollar theater industry (Pratt Center for Community Development, 2014). As advocates also pointed out, manufacturing companies provide well-paying jobs often to people of color, workers with limited formal educational credentials, or those who speak English as a second language. Most importantly, industrial preservationists framed their argument within larger trends that have suggested that the rise of income inequality is due in large part to the decline in manufacturing jobs and the rise of a bifurcated labor market that leaves little room for middle-class jobs (Friedman, 2009).

Industrial preservationists put forward several recommendations to help retain industrial uses in the city in the wake of the Bloomberg-era rezonings. For example, in 2003, the New York Industrial Retention Network organized the “Zoning for Jobs” coalition, which represented a coalition of over 50 community groups, community activists, and labor unions. The “Zoning for Jobs” coalition pressed the Bloomberg administration to adopt “Balanced Mixed-Use Districts,” which would require that a certain percentage of floor area of new buildings be dedicated to industrial uses, thus preserving industrial uses in future building construction (New York City Council, 2014). The Brooklyn Coalition for Equitable Development in turn argued that the city
create “sustainable” or “non-transitional” mixed-use zones, which would make it more difficult for landlords to evict manufacturers from industrial properties (Wolf-Powers, 2003). This zoning change intended to provide greater protection to industrial uses that faced displacement pressures or landlord intimidation tactics, particularly in gentrifying neighborhoods such as Williamsburg and Greenpoint (Curran, 2006). Through these recommendations, industrial preservationists advocated for solutions that implicitly asked the Bloomberg administration to acknowledge the continued role that industrial activities play in the New York City economy. In the end, the Bloomberg administration would implement a different strategy to protect urban industry altogether.

**Industrial Business Zones**

In 2006, the Bloomberg administration launched the Industrial Business Zone (IBZ) program, which aimed to attract and retain industrial uses and industrial employment by offering tax credits and business support services to existing industrial businesses and industrial businesses that relocated to designated geographic areas throughout New York City. The IBZ program represented the administration’s response to industrial preservationists’ advocacy, particularly as real estate speculation continued to rise in manufacturing and industrial districts following the rezoning of Long Island City and Hudson Yards for residential development. The prospect that the Bloomberg administration would rezone other industrial neighborhoods for future residential uses encouraged industrial landlords to engage in speculative behaviors, such as offering industrial tenants short-term leases or temporarily removing their properties from the market in anticipation of future rezonings (Berger, 2005). In response to these dynamics, the Bloomberg administration designated IBZs in three of the city’s five boroughs, including the Bronx, Brooklyn, and Queens (additional boundaries were later drawn in Staten Island in 2013) (Figure 1).
IBZ Selection Criteria

The IBZ Boundary Commission, which was composed of the commissioners from various municipal departments, the five borough presidents, and a community member affiliated with the industrial sector, together were responsible for designating IBZ boundaries throughout the city. According to the city’s 2006 Administrative Code, the IBZ Boundary Commission could designate a given area as an IBZ if it was zoned for manufacturing uses (M-1, M-2, or M-3 zoning) and if the
commission determined that “the market conditions in such area or areas are such that the availability of an industrial business zone tax credit is required in order to encourage industrial and manufacturing activities in such area or areas” (NYC Laws, “Chapter 6-D - Industrial Business Zones”, n.d.). The 2006 Administrative Code further delineated that the commission should consider six factors when designating an area as an IBZ. These factors included an area’s existing land uses, its industrial and manufacturing character, its development potential for industrial and manufacturing activities, the presence of as-of-right zoning for new residential development, vehicular traffic patterns, and existing empire zone boundaries (NYC Laws, “Chapter 6-D - Industrial Business Zones”, n.d.).

In practice, however, the IBZ Boundary Commission likely also factored in whether or not a given area was slated for future housing development in defining the boundaries of IBZs. For example, the turf war that emerged between industrial preservationists and real estate developers in Brooklyn’s Red Hook neighborhood is demonstrative of how real estate interests influenced which areas were designated as IBZs. When the IBZ Boundary Commission first drew the boundaries of the Southwest Brooklyn IBZ, the commission included the site of the former Revere Sugar refinery in Red Hook in the IBZ. At first, this designation appeased industrial preservationists who argued that preserving the refinery for industrial and manufacturing uses would help preserve one of the last working waterfront neighborhoods in the city (Bagli, 2006). In response to the city’s proposal to include the Revere Sugar refinery in the IBZ, real estate interests mobilized, arguing that the former Revere Sugar refinery, which Thor Equities had tentative plans to convert into a luxury housing and office space project, should not be incorporated in the Southwest Brooklyn IBZ (Cohen, 2006). In the ensuing turf war, the Bloomberg administration ultimately caved to developer pressures and conveniently excluded the Revere Sugar refinery from the Southwest Brooklyn IBZ, effectively paving the way for future housing development and sending the signal that the administration would
not let industrial uses stand in the way of future residential development, arguably the Bloomberg administration’s raison d’être.

**Financial Incentives**

The Bloomberg administration argued that the IBZ program would help to attract and retain industrial businesses in New York City through a variety of mechanisms. First, the Bloomberg administration provided relocation tax credits and a number of business support offerings to industrial firms that relocated inside of the IBZs (New York City Department of City Planning, n.d.). For example, industrial businesses (which included firms in the manufacturing, construction, wholesale trade, transportation, utilities, waste management, research and development laboratories, and motion picture production) that relocated within an IBZ received a $1,000 per employee tax credit (capped at $100,000) (New York City Economic Development Corporation, n.d.). In addition, the New York City Department of Small Business Services offered tailored service offerings to industrial companies that relocated inside of an IBZ, ranging from financial and legal assistance to workforce development programs. The Bloomberg administration also vowed to discourage illegal industrial building conversions by imposing higher fines and to reduce parking violations that were issued to industrial fleet vehicles (City of New York, 2005).

In addition, the IBZ program aimed to attract and retain industrial businesses by providing favorable land use controls in IBZs while stopping short of writing the IBZs into the NYC zoning code. Specifically, the administration vowed that they would not rezone the IBZs for residential uses and thus argued that the IBZs would provide a “safe haven by removing the threat of residential rezoning” in designated IBZs (New York City Council, 2014, p. 15).

The Bloomberg administration also argued that the IBZ program would help to stabilize industrial employment in the wake of a decades-long decline in well-paying manufacturing jobs in
the city. In a 2005 white paper called *Protecting and Growing New York City’s Industrial Job Base*, the Bloomberg administration argued that the IBZ program would provide additional jobs and training opportunities for workers in the industrial sector, which the report pointed out, included mostly people of color, people who spoke English as a second language, or people who had few formal educational credentials (City of New York, 2005). The administration therefore positioned the IBZ program as a way to stem future industrial job losses and preserve well-paying, middle-class jobs for marginalized workers throughout the city.

Criticism of the IBZ program was swift. Citing a loophole in the program’s implementation, opponents argued that the IBZ program fundamentally failed to reduce the real estate competition that industrial users often experienced from non-industrial users before the start of the IBZ program (Friedman, 2009). As the argument went, since the geographic boundaries of IBZs were not codified in the New York City zoning code, non-industrial users could still locate as-of-right within designated IBZs (Pratt Center for Community Development, 2008). This distinction mattered because in as-of-right development, non-industrial users could bypass the city’s Uniform Land Use Review Procedure, preventing members of the public or elected officials from considering the potential adverse side effects of a non-industrial use, such as a residential development project, locating in an IBZ (Pratt Center for Community Development, “Hotel Development in NYC,” 2015). Critics therefore contended that the IBZ program lacked substantive regulatory teeth.

This loophole enabled landlords of industrial buildings to continue to practice anti-industrial practices in IBZs, such as picking tenants who would pay the highest rental price for their space in concordance with the principal of the “highest and best” use (Wolf-Powers, 2004). As Adam Friedman of the Pratt Center for Community Development explains, landlords often pick non-industrial users to rent out their space given the financial realities of operating an industrial business: “Manufacturing is a high-value added activity because a manufacturer's major investment are in
labor and equipment. They have little money left over to pay for land, which means manufacturers pay low rents relative to other uses, leaving them vulnerable to displacement” (Friedman, 2009, p. 29). Furthermore, critics argued that the IBZ program was not insulated from changes in political will; since the IBZ boundaries were not codified in the New York City zoning code, subsequent administrations could decide to slash funding for the program (McCormick, 2015).

Wrapped up in opponents’ criticism of the IBZ program stood a larger fear, however: if current trends continued unabated, the IBZ program would continue to erode the city’s already dwindling blue-collar manufacturing employment base under the guise of a purportedly pro-manufacturing agenda. Citing instances in which high-tech companies moved into fashionable converted lofts in IBZs, opponents warned that high-tech jobs would replace the blue-collar manufacturing jobs that the IBZ program said it aimed to protect in the first place (Crean, 2011). As Michelle da la Uz, director of the Fifth Avenue Committee, a community-based organization in south Brooklyn, noted in a recent City Limits article, “Traditional industrial businesses can be displaced not only by housing, hotels and bars, but also by more profitable creative-class enterprises. This newer generation of maker spaces and other emerging industries such as technology, have yet to provide the same job pipeline out of poverty as traditional industrial firms” (Savitch-Lew, 2016).

Witnessing the erosion of middle-skill, middle-class job opportunities across the city, critics feared that in its current implementation, the IBZ program could further exacerbate skills polarization. As Bruno Holst, a woodworker whose business was priced out of several Brooklyn neighborhoods, plainly explained how industrial rezonings would exacerbate skills polarization in 2005: “The city is going to be service oriented and there will be no manufacturing left. If you’re not a doctor or a lawyer, where are you going to work? We all can’t be computer experts. Everybody has a car, but nobody’s a mechanic” (Gonzalez, 2005).
Conclusion

Taken together, this overview of manufacturing policy in New York City indicates that the city’s approach to protecting urban industry has been a fickle one at best. In previous decades, the city has attempted to find the right balance between relegating industrial uses out of core business districts while carving out space for needed industrial infrastructure. As part of this process, the city has continued to grapple with several key questions, including 1) To what extent do industrial uses deserve a prominent seat at the table in the purportedly “post-industrial” city?; and 2) Is it the city’s responsibility to support the industrial sector while the market otherwise marches towards growth in professional services?

These questions are important ones in that they set the stage to analyze the extent to which the Industrial Business Zone program represented a good-faith effort to promote a thriving industrial sector or whether the program merely intended to placate a raucous chorus of criticism from influential labor unions and community groups representing the industrial sector. With these questions in mind, the following chapters examine the extent to which the city’s 2006 Industrial Business Zone program created a favorable climate to industrial businesses and industrial employment.
CHAPTER 4
RESEARCH METHODOLOGY

This paper evaluates the extent to which New York City’s Industrial Business Zone program created a climate favorable to industrial businesses and industrial employment. In order to examine this question, I examine how four measures of industrial activity (industrial business registrations, industrial employment, industrial building permits, and industrial land) changed between 2000 and 2013 at the Census Block level in IBZs compared to a control group established using propensity score matching. This chapter begins with a description of how each of these four units of industrial activity were selected to evaluate the performance of the IBZ program. Next, this chapter provides an overview of the various datasets that were used in this analysis. Then, this chapter discusses the methodology for conducting the propensity score matching and concludes with a discussion of methodological limitations.

Selected Units of Analysis

This analysis assesses the overall effectiveness of the IBZ program by evaluating how four measures of industrial activity, including industrial land, industrial employment, industrial business registrations, and industrial building permits, have changed over time in IBZ Census Blocks compared to similar Census Blocks not part of the IBZ program. I examine these four units of analysis on the basis that they provide insight into the overall health of the industrial sector and capture the program’s intended impact of attracting and retaining industrial businesses and industrial employment, while also stymying the continued decline of industrial land.

Industrial Business Registrations
One of the primary objectives of the Industrial Business Zone program was to attract new industrial businesses to IBZs, with the goal of “foster[ing] high-performing business districts by creating competitive advantages over locating in areas outside of New York City” (New York City Economic Development Corporation, n.d.). Thus, examining the percent change in new industrial business registrations in IBZ areas compared to similar, non-IBZ areas provides insight into the extent to which the IBZ program created a climate favorable to new industrial business starts.

**Industrial Employment**

In addition to attracting new industrial businesses to IBZs, the city also positioned the IBZ program as an industrial retention tool, describing the program as a means to “protect existing manufacturing districts” and retain existing industrial employment (New York City Economic Development Corporation, n.d.). Therefore, examining the percent change in industrial employment in IBZs compared to non-IBZs provides one measure of the extent to which the IBZ program helped to stem industrial employment losses.

**Industrial Building Permits**

Since information on industrial output is not readily available at the geographic level used in this analysis, I instead examine industrial building permit activity as one measure of the relative health of the industrial sector. Industrial building permits provide one measure of the financial health of a business, as they indicate the extent to which industrial businesses are able to make investments in capital upgrades, such as renovating or expanding their existing facilities to accommodate new modes of production. One would expect that given the resources offered to industrial businesses in IBZs, these businesses might be better poised to make capital upgrades and that industrial building permit activity would thus be higher in IBZs compared to non-IBZ areas.
Industrial Land Use

One of the main objectives of the IBZ program was to arrest the continued decline of industrial land and create industrial “safe havens” by committing to not rezone Industrial Business Zones for residential uses (New York City Economic Development Corporation, 2013, p. 1). While no IBZs were rezoned for residential uses after the program started, other uses, such as hotels, could still locate as-of-right in IBZs at the time, likely detracting from the overall stock of industrial land in IBZs (Pratt Center for Community Development, 2015). Thus, examining how the amount of industrial land in IBZ areas compared to non-IBZ areas changed over time provides one measure of the program’s effectiveness at retaining industrial land.

Datasets

In order to examine each of the four units of analysis described above, I examine trends within Industrial Business Zones at the Census Block level. I relied on several datasets, which are described in further depth below, to conduct this analysis.

Industrial Business Zone Boundaries

I identified 2000 Census Blocks part of the IBZ program using a dataset from the New York City Economic Development Corporation that lists the roughly 9,000 tax lots that the IBZ Boundary Commission designated as part of the IBZ program in 2006. Figure 2 shows the distribution of the sixteen IBZs designated in 2006 at the tax lot level. It is worth noting that the IBZ Boundary Commission designated additional IBZs after 2013 and made minor modifications to
the IBZ boundaries that were established in 2006. For this reason, this analysis only examines trends up through 2013.

**Figure 2 Industrial Business Zones in New York City by Borough**

I consider Census Blocks to be part of the IBZ program if at least one tax lot within a Census Block was designated as part of the IBZ program. In the vast majority of cases, all tax lots on a given Census Block were designated as part of the IBZ program. However, 5% of Census
Blocks examined in this analysis included some tax lots that were designated as part of the IBZ program and others that were not, complicating whether a given Census Block should be considered part of the IBZ program. Given the minority of Census Blocks that fell into this scenario, I still considered a Census Block to be part of the program if it had at least one IBZ-designated tax lot within its borders; nonetheless, this should be considered a methodological limitation of this paper.

**Industrial Land Use and Zoning**

In order to track industrial land use and zoning information at the Census Block level over time, I used the New York City Department of City Planning’s Primary Land Use Tax Lot Output (PLUTO) dataset. The PLUTO dataset provides extensive land use and zoning information for the over 800,000 tax parcels across New York City, including its primary land use and zoning. In instances where a tax parcel is divided by more than one zoning boundary line, the PLUTO dataset reports the zoning classification that takes up the largest percentage of the tax lot’s area (New York City Department of City Planning, 2018). I used the PLUTO dataset to aggregate information about individual tax lots’ zoning and land use information up to the Census Block level for analysis.

**Industrial Employment**

In order to obtain industrial employment information at the Census Block level, I relied on the U.S. Census Bureau’s LEHD Origin-Destination Employment Statistics (LODES) dataset. An annual dataset, the LODES dataset provides information on workplace-area characteristics at the Census Block level, such the total number of workers employed in a given industrial sector, reported at the 2-digit North American Industry Classification Code (NAICS code) level. Using a definition of industrial activity used elsewhere in the literature, I considered the following NAICS codes as
industrial sectors: 22 (utilities), 31-33 (manufacturing), 42 (wholesale trade), or 48-49 (transportation and warehousing) (Howland, 2011).

Industrial Business Registrations

In order to examine industrial business registrations at the Census Block level, I relied on a dataset of industrial business registrations obtained through a Freedom of Information Act (FOIA) request to the New York State Department of Taxation and Finance. The dataset includes business registration information on all individuals or businesses that “sell taxable tangible personal property or taxable services” in New York State from the 1970s to the present (New York State Department of Taxation and Finance, n.d.). The dataset derives its information from the New York State Department of Taxation and Finance’s Form DTF-17.1, which all individuals or businesses are required to complete in order to register as a sales tax vendor in New York State and collect sales taxes.

The business registration dataset includes information on the name of the newly registered business, the businesses’ street address, the date that the newly registered business opened, and the 6-digit NAICS code associated with the business when it opened. Using the same definition of industrial activity described above, I defined industrial businesses as those with any of the following 2-digit NAICS codes: 22 (utilities), 31-33 (manufacturing), 42 (wholesale trade), or 48-49 (transportation and warehousing).

Industrial Building Permits

In order to examine industrial building permit activity at the Census Block level, I relied on a building permit dataset from the New York City Department of Buildings, which contains information on roughly 1.4 million building permits that were issued in New York City from the
early 2000s to the present. The dataset includes information such as the street address associated with the building permit, the date that the building permit was issued, the estimated cost of the construction activities, and the existing occupancy of the space where the permitted construction took place.

A building’s occupancy classification, which refers to the “purpose or activity for which a building or space is used or designed, arranged, or intended to be used,” determined whether a given permit should be considered industrial or not (NYC Law & Codes, n.d.). For the purpose of this analysis, I defined permits with Class A (high hazard manufacturing), Class B (moderate- to low-hazard storage), and Class D (low- to moderate- hazard fabrication) building occupancies as industrial building permits. However, it is worth noting that it is not possible to determine whether a given industrial building permit was in fact filed by an industrial business; in theory, a given industrial permit could be filed by a residential user. Thus, industrial building permit activity should be treated as a proxy measure for permit activity carried out by industrial businesses.

**Geospatial Analysis**

Together these datasets enabled an examination of how the IBZ program impacted various metrics of industrial activity at the Census Block level. In order to conduct this analysis, the first step involved aggregating each of the aforementioned measures of industrial activity up to the Census Block level. To do so, the first step in this process involved using Google’s geocoding API to geocode the location of over 22,000 industrial business registrations and 1.4 million building permits. Next, I created a dummy variable to indicate whether or not a given Census Block was part of the IBZ program, assigning IBZ designation to any Census Block with at least one IBZ-designated tax lot within its border. After that, I linked this information with the land use, employment, business registrations, and permits datasets. After aggregating to the Census Block
level, I normalized three of the four units of analysis (land use, business registrations, and permits) by the total land area of the Census Block, enabling a comparison of various measures of industrial activity across Census Blocks of different sizes. This information ultimately enabled the next step of the analysis, the establishment of the comparison group through propensity score matching.

**Comparison Group Selection**

This paper used propensity score matching to identify Census Blocks in New York City that reflected similar characteristics as IBZ Census Blocks before the start of the IBZ program in 2006. Propensity score matching is a statistical technique in which a treatment case is matched with one or more control cases after considering various baseline covariates that predict receiving the treatment. Quasi-experimental designs often leverage propensity score matching as a way to reduce selection bias in the process of choosing a control group (Randolph et al., 2014). Developed using logistic regression, propensity scores represent the probability that a given unit of analysis (e.g. a Census Block) receives a treatment based on a series of baseline covariates. These baseline covariates represent a set of explanatory variables that in theory predict whether or not a given unit of analysis will receive the treatment. In the context of the IBZ program, potential covariates include factors that might have encouraged the IBZ Boundary Commission to designate some areas in New York City and not others as part of the IBZ program.

Once the propensity scores have been developed, the propensity score is inputted into an algorithm that determines the best match between a treatment case and one or more control cases. Depending on the software used, various algorithms can be used to execute the matching process (Randolph et al., 2014). Once the matching process is complete, the end result is a treatment and control group that should reflect similar baseline characteristics (Hollander & Renski, 2017).
Propensity Score Matching

The first step in creating the propensity scores involved developing a list of potential explanatory variables that in theory could help explain whether or not a given Census Block was designated as part of the IBZ program. Table 1 presents a list of the five covariates that were identified as factors that are significantly receiving the treatment (i.e. IBZ designation) and that were included in the final propensity score model.

Table 1 Variables used in propensity score matching model

<table>
<thead>
<tr>
<th>Source</th>
<th>Measure</th>
<th>Geographic Level</th>
<th>Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NYC Department of City Planning</td>
<td>Percent Industrial Land Use (Percent of Census Block dedicated to industrial uses)</td>
<td>Census Block</td>
<td>2005</td>
</tr>
<tr>
<td>NYC Department of City Planning</td>
<td>Percent Manufacturing Zoning (Percent of Census Block dedicated to manufacturing zoning uses)</td>
<td>Census Block</td>
<td>2005</td>
</tr>
<tr>
<td>U.S. Census Bureau, LEHD Origin-Destination Employment Statistics (LODES)</td>
<td>Industrial Employment Density (Total industrial employees/land area of Census Block)</td>
<td>Census Block</td>
<td>2005</td>
</tr>
<tr>
<td>New York State Department of Taxation and Finance Form DTF-17.1</td>
<td>Industrial Business Registration Density (Total industrial business registrations/land area of Census Block)</td>
<td>Census Block</td>
<td>2000-2005</td>
</tr>
<tr>
<td>New York City Department of Buildings</td>
<td>Industrial Building Permit Density (Total industrial building permits/land area of Census Block)</td>
<td>Census Block</td>
<td>2000-2005</td>
</tr>
</tbody>
</table>

After identifying these covariates, I used R's MatchIt package to develop propensity scores using the nearest neighbor algorithm. The nearest neighbor algorithm matches treated Census Blocks with untreated Census Blocks that have the closest propensity score to their own. After running the propensity score matching algorithm, the model matched 1,250 IBZ Census Blocks with 1,250 control Census Blocks. Figure 3 presents the spatial distribution of the treatment and control groups. As Figure 3 shows, the spatial distribution of the control group is relatively evenly spread throughout New York City’s five boroughs, with roughly 12% of control Blocks located in the Bronx, 35% in Brooklyn, 14% in Manhattan, 32% in Queens, and 7% in Staten Island.
Results from the model demonstrate that propensity score matching successfully identified a set of control Census Blocks that reflect similar characteristics as IBZ Census Blocks. Comparing the characteristics of pre-matching and post-matching Census Blocks demonstrates this point. As Table 2 shows, before matching, there were statistically significant differences between IBZ and non-IBZ Census Blocks for every measure of industrial activity examined. Before matching, the mean industrial employment density, industrial business registration density, and industrial permit density were all considerably higher in IBZ Census Blocks than in control Census Blocks. Likewise,
the percentage of the IBZ Census Blocks dedicated to industrial uses and manufacturing zoning were also higher than in the control Census Blocks.

Table 2 Difference of means, pre-matching characteristics of IBZ versus non-IBZ Census Blocks

<table>
<thead>
<tr>
<th></th>
<th>IBZ Census Blocks</th>
<th>Control Census Blocks</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propensity Score</td>
<td>0.44</td>
<td>0.01</td>
<td>0.42</td>
</tr>
<tr>
<td>Percent Industrial Use</td>
<td>0.49</td>
<td>0.02</td>
<td>0.47</td>
</tr>
<tr>
<td>Industrial Employment Density</td>
<td>3.4</td>
<td>0.55</td>
<td>2.85</td>
</tr>
<tr>
<td>Industrial Business Registration Density</td>
<td>0.01</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Industrial Building Permit Density</td>
<td>0.01</td>
<td>0</td>
<td>0.01</td>
</tr>
<tr>
<td>Percent Manufacturing Zoned</td>
<td>0.91</td>
<td>0.05</td>
<td>0.86</td>
</tr>
</tbody>
</table>


After matching, however, there was no statistically significant difference between any of the measures of industrial activity or the propensity scores of IBZ Census Blocks and the matched control Census Blocks (Table 3). This information indicates that the overall characteristics of the IBZ Census Blocks and the control Census Blocks are markedly similar.

Table 3 Difference of means in post-matching characteristics of IBZ versus non-IBZ Census Blocks

<table>
<thead>
<tr>
<th></th>
<th>IBZ Census Blocks</th>
<th>Control Census Blocks</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propensity Score</td>
<td>0.44</td>
<td>0.39</td>
<td>0.06</td>
</tr>
<tr>
<td>Percent Industrial Use</td>
<td>0.5</td>
<td>0.38</td>
<td>0.12</td>
</tr>
<tr>
<td>Industrial Employment Density</td>
<td>3.41</td>
<td>3.43</td>
<td>-0.02</td>
</tr>
<tr>
<td>Industrial Business Registration Density</td>
<td>0.01</td>
<td>0.01</td>
<td>0</td>
</tr>
<tr>
<td>Industrial Building Permit Density</td>
<td>0.01</td>
<td>0.01</td>
<td>0</td>
</tr>
<tr>
<td>Percent Manufacturing Zoned</td>
<td>0.92</td>
<td>0.92</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 4 presents a series of histograms showing the distribution of propensity scores of the raw treatment, raw control, matched treated, and matched control units. As Figure 4 shows, the distribution of propensity scores for raw treatment and raw control units before matching have very different propensity score distributions before matching. After matching, however, the matched treatment and matched control units have similar propensity score distributions.

**Figure 4** Distribution of propensity scores in raw treatment, raw control, matched treated, and matched control units

Methodological Limitations

There are several methodological limitations and assumptions associated with this analysis. First, as previously mentioned, I considered a given Census Block to be part of the IBZ program if it had at least one IBZ-designated tax lot within its borders. In 95% of cases, all tax lots in a given
Census Block were designated as part of the IBZ program, but in some instances, a Census Block contained both IBZ and non-IBZ designated tax lots, complicating whether the Census Block should in fact be considered part of the IBZ program. Given the minority (5%) of Census Blocks that fell into this scenario, I considered a Census Block to be part of the IBZ program if it had at least one IBZ-designated tax lot within its borders. Nonetheless, this assumption should be treated as a methodological limitation of the analysis.

The remaining methodological limitations of this analysis were associated with the datasets used. First, the LODES employment dataset did not report employment information for some U.S. Census Blocks, the majority of which corresponded to parkland throughout New York City. I handled this missing data issue by assuming that these Census Blocks had no industrial workers employed within them. Second, this analysis only considered the NAICS codes of industrial business registrations at the time that a business opened. Thus, if a business changed its NAICS code from a hair salon to a nail salon, this analysis did not account for this change in industrial classification over time. Finally, some of the building permits included in the NYC Department of Buildings dataset had missing street address or building occupancy information, inhibiting successful geocoding of the building permit. In these instances, these building permits were not considered as part of the analysis.
CHAPTER 5

RESEARCH FINDINGS

This chapter examines how various measures of industrial activity, including new industrial business registrations, industrial employment, industrial building permits, and the stock of industrial land, changed over time in IBZ Census Blocks compared to similar industrial areas throughout NYC before and after the start of the IBZ program. Examining these different measures of industrial activity provides an overall portrait of the extent to which the IBZ program created a climate favorable to industrial activities.

Industrial Business Registrations Findings

Citywide Trends

Between 2000 and 2017, over 22,000 industrial businesses opened up shop in New York City. Over this time period, the annual number of industrial business registrations increased, with industrial businesses in the wholesale trade and manufacturing sectors in particular experiencing positive growth (Figure 5).
This finding that the manufacturing sector experienced relatively high growth aligns with findings described elsewhere in the literature demonstrating that small-scale manufacturers, particularly those engaged in 3D printing, metal and wood fabrication, and food and beverage manufacturing, have enjoyed particular success in New York City in recent years (Euchner, 2016). The manufacturing sector has performed well in recent years in large part due to the rise of makers, or manufacturers that, plugging into an anti-corporate ethos in urban markets, have started to create locally crafted, customized products. Such small-scale manufacturers likely have been able to nurture their businesses at any number of industrial incubators and collaborative maker spaces that have cropped up across the city in recent years, such as at Futureworks, a 20,000 square-foot advanced manufacturing center that recently opened up in Sunset Park, Brooklyn.

The rise of the maker movement might also explain the notable increase in wholesale business registrations in recent years as well, as small-scale manufacturers transition to selling their products to wholesale markets. As a recent study of New York City makers found, small-scale manufacturers have increasingly relied on digital technology to identify global consumers and
expand into global wholesale markets (Doussard, Schrock, Wolf-Powers, Eisenburger & Marotta, 2017). As small-scale manufacturers have expanded their reach beyond local markets, this latter trend might help to explain the overall rise of business registrations in the wholesale trade sector in recent years.

Industrial Business Zone Trends

As industrial business registrations increased citywide during the study period, industrial business registrations likewise increased in both the IBZ Census Blocks and the control Census Blocks between 2000 and 2013. Notably, however, IBZ Census Blocks experienced lower growth in new industrial business registrations compared to the control group and compared to the citywide average. Between 2000 and 2013, industrial business registrations increased by roughly 134% in IBZ Census Blocks (Table 4). In comparison, industrial business registrations increased by roughly 201% in the control Census Blocks and by 190% citywide during the same time period.

Table 4 Industrial business registrations in IBZ Census Blocks, control Census Blocks, and citywide

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ Census Blocks</td>
<td>330</td>
<td>773</td>
<td>134%</td>
</tr>
<tr>
<td>Control Census Blocks</td>
<td>279</td>
<td>839</td>
<td>201%</td>
</tr>
<tr>
<td>Citywide</td>
<td>3,191</td>
<td>9,241</td>
<td>190%</td>
</tr>
</tbody>
</table>

The fact that IBZ Census Blocks did not perform as well as the control group or the citywide average in terms of industrial business registrations calls into question the extent to which the IBZ program actually created a more favorable climate for encouraging new industrial business starts. Given that one of the main objectives of the IBZ program’s relocation tax credit was to “attract and keep industrial companies within the IBZs,” this finding suggests that IBZs failed to
measure up to similar areas on this count, with the control group outperforming IBZ areas in terms of encouraging greater growth in industrial business registrations (The City of New York, 2004, p. 17).

Examining industrial business registrations by their specific industrial sector provides additional insight into how IBZs helped bolster more business registrations in one industry over another. As Table 5 shows, industrial business registrations increased in every sector between 2000 and 2013 in both the control and treatment groups. Among IBZ Census Blocks, industrial business registrations in the manufacturing sector experienced the highest growth (153%), followed by wholesale trade (128%) and transportation and warehousing sectors (87%). Among the control Census Blocks, manufacturing business registrations likewise increased by 153%. Business registrations in the wholesale trade and transportation and warehousing industries also grew in the control Census Blocks, increasing by 224% and 408%, respectively. This finding that the treatment and control groups witnessed the same percentage increase in manufacturing business registrations between 2000 and 2013 suggests that IBZs did not have a meaningful impact on encouraging increased manufacturing business registrations.

Table 5 Industrial business registrations by sector in IBZ Census Blocks and control Census Blocks

<table>
<thead>
<tr>
<th></th>
<th>IBZ Census Blocks</th>
<th>Control Census Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Registrations, 2000-2005</td>
<td>Registrations, 2007-2013</td>
</tr>
<tr>
<td>Utilities</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>133</td>
<td>356</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>151</td>
<td>344</td>
</tr>
<tr>
<td>Transportation &amp; Warehousing</td>
<td>45</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Registrations, 2000-2005</td>
<td>Registrations, 2007-2013</td>
</tr>
<tr>
<td>Utilities</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>128</td>
<td>324</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>139</td>
<td>451</td>
</tr>
<tr>
<td>Transportation &amp; Warehousing</td>
<td>12</td>
<td>61</td>
</tr>
</tbody>
</table>

Additionally, the finding that the percentage increase in transportation and warehousing business registrations was nearly four times higher in the control group than the treatment group in
some ways is not surprising. Industrial preservationists have long argued that self-storage companies should not be allowed to locate as-of-right in IBZs given that self-storage companies take up large building footprints but offer few industrial jobs (Bockmann, 2017). It is therefore possible that industrial preservationists’ advocacy might have had a chilling effect on self-storage companies who were looking to open up shop within New York City, but who actively sought out areas that would be more hospitable to them. If true, this hypothesis might help explain the considerably higher rate of transportation and warehousing business registrations in the control group and thus the overall higher rate of industrial business registrations in the control group.

Industrial Employment Findings

Citywide Trends

Between 2002 and 2013, industrial employment in New York City declined by roughly 8%, from roughly 433,000 workers in 2002 to roughly 398,000 workers in 2013 (Figure 6). During this time period, different industrial sectors experienced varying levels of growth following the launch of the IBZ program in 2006. Between 2006 and 2013, or the years immediately after the start of the IBZ program, employment in the utilities and transportation and warehousing industries both increased by 32%. In comparison, citywide manufacturing employment decreased by roughly 28%, and employment in the wholesale trade industry declined by roughly 3% citywide.
The fact that the manufacturing industry shed workers during this time period is not surprising, as it follows state and national trends towards a decline in the manufacturing sector amidst the growth of the professional and consumer services sectors and the offshoring of manufacturing jobs overseas. In addition, since industrial business registrations increased as industrial employment decreased during this time period, this finding also suggests that newly registered industrial businesses likely employed fewer employees in the post-IBZ years. This hypothesis is consistent with trends reported elsewhere in the literature, which suggest that the new wave of manufacturing businesses that have opened in New York City in recent years are relatively small, with the majority of manufacturers employing fewer than 10 employees (New York City Economic Development Corporation, 2013, p. 7). Taken together, this finding suggests that new industrial businesses have relatively lean workforces, potentially facilitated by the rise of new technologies that have improved operational efficiency.
Following a citywide decline in the industrial sector, industrial employment declined in both the treatment and control groups between 2005 and 2013 (Table 6). However, industrial employment declined roughly two times faster in the control group than in the IBZ Census Blocks (-24% to -54%, respectively), suggesting that the IBZ program helped industrial businesses to better stem industrial job losses compared to the control group overall.

Table 6 Percent change in industrial employment in IBZ Census Blocks and control Census Blocks, 2005-2013

<table>
<thead>
<tr>
<th></th>
<th>Utilities</th>
<th>Manufacturing</th>
<th>Wholesale Trade</th>
<th>Transportation &amp; Warehousing</th>
<th>Total Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ Census Blocks</td>
<td>265%</td>
<td>-27%</td>
<td>2%</td>
<td>-44%</td>
<td>-24%</td>
</tr>
<tr>
<td>Control Census Blocks</td>
<td>70%</td>
<td>-40%</td>
<td>-16%</td>
<td>-76%</td>
<td>-54%</td>
</tr>
<tr>
<td>Citywide</td>
<td>50%</td>
<td>-33%</td>
<td>-2%</td>
<td>5%</td>
<td>-6%</td>
</tr>
</tbody>
</table>

This finding that IBZs better warded off industrial job losses than the control group may suggest that the workforce training services that were offered to industrial businesses as part of the IBZ program were in fact effective in helping to retain industrial employment in IBZs. Led by local development corporations that partnered with the city’s Department of Small Business Services, the IBZ workforce training services aimed to help manufacturing workers retool their existing skill sets and learn the necessary skills to operate in an increasingly high-tech sector. It is therefore possible that industrial employees employed in IBZs took advantage of these workforce training opportunities and were thus better able to adapt their skills to an increasingly high-technology sector requiring new skills. Following this logic, industrial companies in IBZs might have been better able to stem industrial job losses compared to competitors not located in IBZs and whose workforces were less prepared to adapt to an evolving industrial sector. Taken together, this hypothesis would help explain why IBZs Census Blocks outperformed the control group in terms of industrial employment.
The fact that new industrial business registrations were higher in the control group than the treatment group offers another potential explanation behind the greater loss of industrial employment outside of IBZ areas. As this analysis has shown, new industrial businesses have located in increasing numbers in non-IBZ areas. These new businesses might have been more likely to use cutting-edge technologies in their production processes and therefore have been more likely to employ fewer workers compared to existing industrial businesses. Thus, employment might have declined faster in the control group as cutting-edge industrial companies in IBZs displaced existing industrial businesses in non-IBZ areas whose workforce did not benefit from IBZ workforce training opportunities. If true, this scenario would help explain why industrial employment declined at a faster pace in the control versus treatment group.

While IBZ Census Blocks outperformed the control group in terms of better stemming industrial job losses, examining industrial employment change at finer geographic levels points towards some inter-borough variation in industrial employment losses. As Table 7 shows, industrial employment in IBZ Census Blocks in the Bronx and Brooklyn increased, while industrial employment in the control Census Blocks decreased, suggesting that IBZ Census Blocks outperformed the control group. However, as Table 7 also shows, industrial employment in IBZ Census Blocks located in Queens declined at twice the rate of industrial employment in the control group, suggesting that industrial businesses in Queens that were not located in IBZs were better able to stem job losses (trends are not reported in Staten Island and Manhattan given that no IBZs were designated in those boroughs). This variation suggests that some IBZs might have had competitive advantages over others. While examining inter-IBZ variation in industrial employment change is beyond the scope of this analysis, this finding suggests that such an inquiry is merited.

Table 7 Inter-borough variation in industrial employment change in IBZ Census Blocks and control Census Blocks, 2000-2013
Industrial Building Permits Findings

Citywide Trends

Between 2000 and 2017, the New York City Department of Buildings issued nearly 24,000 industrial building permits. During this time period, industrial building permit activity increased overall, accelerating rapidly following the Great Recession and the start of the IBZ program in 2006 (Figure 7). On average, the New York City Department of Buildings issued roughly 1,300 industrial building permits per year, with the highest proportion of industrial building permits issued in Manhattan, followed by Brooklyn, Queens, the Bronx, and Staten Island.

<table>
<thead>
<tr>
<th>Borough</th>
<th>IBZ Census Block</th>
<th>Control Census Blocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronx</td>
<td>5%</td>
<td>-26%</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>5%</td>
<td>-81%</td>
</tr>
<tr>
<td>Queens</td>
<td>-46%</td>
<td>-21%</td>
</tr>
</tbody>
</table>

Figure 7 Issued industrial building permits in New York City, 2000-2017
One potential explanation behind the rapid escalation in industrial permit activity over this time period might be related to the emergence of high-tech advanced manufacturing activity in the city and the changing physical space needs that advanced manufacturing operations require (New York City Economic Development Corporation, 2013). As manufacturing companies increasingly integrate sophisticated technologies into their design, testing, and prototyping processes, these companies often need to adapt the physical layout of their spaces to accommodate a new range of employment activities (Wial, 2015). For example, as a recent planning study conducted by the NYC Department of City Planning illuminated, industrial companies have varied physical space needs given the diverse mix of industrial activities that take place under their roofs, from traditional desk space for software developers to fab labs for technicians operating state-of-the-art 3D printing technology (New York City Department of City Planning, 2018). As industrial companies space needs have evolved in tandem with their operations, it is possible that the recent increase in industrial building permit activity can be attributed to industrial companies that have started to retrofit their spaces to accommodate their new physical space needs.

The industrial building permits that the NYC Department of Buildings issued during these years allowed for a full range of construction activity, from small-scale plumbing work to wholesale renovations that require multiple kinds of construction work. Building permits are divided into five categories including new building permits, demolition permits, and Alteration 1, 2, or 3 permits. New building permits are issued for the construction of new buildings, and demolition permits cover construction activity that involve excavating or demolishing a building. Alteration 1 permits are required when major construction activity will impact the use, egress, or occupancy of a building, requiring a new Certificate of Occupancy. Alteration 2 permits cover construction activity that require multiple types of work, such as electrical and plumbing work, but that do not require a new Certificate of Occupancy (Neuman, 2011). Finally, Alteration 3 permits cover minor construction
work, such as a curb cut, and that do not impact the use, egress, or occupancy of a building (New York City Department of Buildings, n.d.).

Examining industrial building permit activity according to permit type and their average cost of construction activity provides insight into the extent to which industrial businesses might have been investing in their businesses in IBZ areas compared to non-IBZ areas. Between 2000 and 2017, roughly two-thirds of industrial building permits that the NYC Department of Buildings issued were for Alteration 2 permits (Table 8). This finding suggests that industrial landlords permitted relatively large-scale construction activity on their properties to the extent that these building permits authorized repair work that would involve multiple kinds of construction work. As Table 8 also shows, construction activity cost industrial users an estimated $135,000 on average, suggesting that they invested a nontrivial amount in upgrading, repairing, or expanding their physical spaces. While it bears repeating that it is not possible to know whether an industrial business or individual user applied for the permit, it is likely that industrial businesses applied for the majority of industrial building permits given that these permits were issued in buildings most compatible with industrial uses (i.e. buildings with building occupancies corresponding to high hazard manufacturing, moderate- to low-hazard storage, or low- to moderate-hazard fabrication).

**Table 8 Industrial business permit activity by permit type and average cost of construction, 2000-2017**

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Total Permits</th>
<th>Average Cost of Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alteration 1</td>
<td>1,142</td>
<td>$608,193</td>
</tr>
<tr>
<td>Alteration 2</td>
<td>16,132</td>
<td>$154,249</td>
</tr>
<tr>
<td>Alteration 3</td>
<td>5,116</td>
<td>$6,916</td>
</tr>
<tr>
<td>Demolition</td>
<td>1,436</td>
<td>$1,805</td>
</tr>
<tr>
<td>New Building</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23,827</strong></td>
<td><strong>$135,178</strong></td>
</tr>
</tbody>
</table>

Industrial Business Zone Trends
Between 2000 and 2013, the number of issued industrial permits increased in both the IBZ Census Blocks and in the control group. The percent change in the number of issued industrial building permits was substantially higher in the control group than the IBZ group, suggesting that the IBZ program did not have a meaningful impact on encouraging greater building permit activity compared to the control group.

**Table 9 Industrial business permit activity in IBZ Census Blocks and control Census Blocks, 2000-2013**

<table>
<thead>
<tr>
<th></th>
<th>Number Industrial Building Permits, 2000-2005</th>
<th>Number Industrial Building Permits, 2007-2013</th>
<th>Percent Change in Industrial Building Permits, 2000-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ Census Blocks</td>
<td>294</td>
<td>1,093</td>
<td>272%</td>
</tr>
<tr>
<td>Control Census Blocks</td>
<td>289</td>
<td>1,379</td>
<td>377%</td>
</tr>
<tr>
<td>Citywide</td>
<td>1,208</td>
<td>9,934</td>
<td>722%</td>
</tr>
</tbody>
</table>

One potential explanation of this trend is that industrial businesses located in IBZs, facing continuing real estate pressures, had to make a tradeoff between hiring additional employees and investing in new physical infrastructure. As this analysis has shown, industrial employment in the control group declined at twice the rate of IBZ areas, although industrial building permit activity increased at a higher rate in the control group during the study period. This finding might suggest that non-IBZ industrial businesses with leaner workforces might have had wider margins to invest in capital upgrades compared to IBZ industrial businesses burdened by higher labor force costs.

Yet, solely examining the number of industrial building permits issued only provides a partial portrait of how industrial businesses fared in IBZ and non-IBZ areas of the city. Instead, examining how the average amount of money spent on a building permit changed over time provides insight into the extent to which the IBZ program might have enabled industrial businesses to invest in their businesses. On average, industrial users in the control group spent more on construction activities ($49,764 to $33,834) than industrial users in the IBZ group (Table 10). Additionally, the average estimated cost of construction increased at roughly the same rate in IBZ and non-IBZ Census Blocks (22% to 20%).
Table 10 Average industrial construction costs in IBZ Census Blocks and control Census Blocks, 2000-2013

<table>
<thead>
<tr>
<th></th>
<th>Average Construction Cost, 2000-2005*</th>
<th>Average Construction Cost, 2007-2013</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ Census Blocks</td>
<td>$27,648</td>
<td>$33,834</td>
<td>22%</td>
</tr>
<tr>
<td>Control Census Blocks</td>
<td>$41,570</td>
<td>$49,764</td>
<td>20%</td>
</tr>
</tbody>
</table>

*In 2013 inflation-adjusted dollars

Taken together, Table 10 points to several important findings. First, if the amount of money spent on permit-related construction is accepted as one indicator of the overall fiscal health of a business, then these findings seem to suggest that industrial users located in non-IBZ areas were actually in better fiscal health than industrial users located in IBZs. Second, findings presented in Table 10 indicate that the IBZ program had a negligible impact on encouraging greater industrial building permit outlays; industrial users in the treatment and comparison groups experienced roughly the same percentage increase in construction costs between 2000 and 2013, suggesting that even with the help of the IBZ program, industrial users located in IBZs did not considerably change their investment patterns in physical upgrades.

**Industrial Land Findings**

**Citywide Trends**

Between 2005 and 2013, the total amount of industrial land declined by roughly 8% citywide. This finding is consistent with industrial preservationists’ claims that industrial land continued to be converted to other uses even after the IBZ program started, as as-of-right hotel and self-storage development continued to infringe on the city’s stock of industrial land.

**Industrial Business Zone Trends**
Between 2005 and 2013, the total amount of industrial land declined in both IBZ Census Blocks and the control group (Table 11). However, industrial land declined at a four times faster rate in the control Census Blocks than in the IBZ Census Blocks (-27% to -6%). Taken together, this finding suggests that the IBZ program helped to better stem the decline of industrial land within designated IBZs areas, highlighting one area of success for the IBZ program.

Table 11 Percent change in industrial land acreage in IBZ Census Blocks and control Census Blocks, 2005-2013

<table>
<thead>
<tr>
<th></th>
<th>Acres of Industrial Land, 2005</th>
<th>Acres of Industrial Land, 2013</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBZ Census Blocks</td>
<td>887</td>
<td>833</td>
<td>-6%</td>
</tr>
<tr>
<td>Control Census Blocks</td>
<td>1,153</td>
<td>839</td>
<td>-27%</td>
</tr>
</tbody>
</table>

Given that industrial land declined at a considerably higher rate in the control group than the IBZ group suggests that designating specific areas as industrial protection zones helps to stem the decline of industrial land. To examine this point, Figure 8 examines which non-industrial uses might have placed heightened conversion pressures on industrial users. As Figure 8 shows, commercial and office building land uses were responsible for the majority of land use conversions within both the control and IBZ groups. For example, while roughly 9% of industrial and manufacturing tax lots converted to commercial and office building uses in the control group, roughly 3% of industrial and manufacturing tax lots in the treatment group converted to commercial and office building uses between 2005 and 2013. In comparison, residential uses (including multi-family walk-up buildings, multi-family elevator buildings, and mixed residential and commercial buildings) accounted for roughly 5% of industrial and manufacturing tax lots that converted in the control group, compared to less than 1% in the IBZ group.

Figure 8 Percent of total industrial and manufacturing tax lots that converted to other uses, 2005-2013
This finding is salient because it provides a counternarrative to industrial preservationists’ claims that residential uses in particular account for the majority of land use conversion in predominantly industrial areas. Instead, as findings from this analysis show, commercial and office buildings are responsible for the greatest proportion of land use conversion, both in and outside of IBZs. As the next chapter will discuss, this finding is relevant to city officials and planners that wish to preserve urban industrial activity in that it identifies commercial and office buildings as one of the greater threats to industrial activities.
CHAPTER 6

POLICY RECOMMENDATIONS

Findings from this analysis indicate that the IBZ program yielded mixed results in its efforts to create a favorable climate for urban industrial activity. As this analysis has shown, the IBZ program did not have a meaningful impact on encouraging new industrial business registrations or encouraging additional investment in physical upgrades or renovations to industrial buildings in IBZs. At the same time, this analysis suggests that the IBZ program had a meaningful impact on helping industrial businesses better stem industrial employment losses and industrial land decline in IBZs. This paper therefore suggests that while the IBZ program performed well as an industrial employment and industrial land retention tool, it did not perform as well as a planning tool designed to encourage additional industrial building investment or new industrial business starts.

Policy Recommendations

Findings from this analysis suggest several avenues for future policymaking in order to strengthen the city’s support for and investment in the industrial sector. These recommendations include:

1. Evaluate the performance of IBZ workforce development programs.

   As this analysis has shown, industrial businesses located in IBZs were better able to stem industrial job losses compared to industrial businesses located outside of IBZs. One potential explanation of this finding is that the workforce development programs that local development corporations offered to industrial businesses provided their employees with a leg up in an increasingly technologically-advanced industrial sector. If true, it follows that industrial employees, armed with cutting-edge skills, might have helped industrial businesses
in IBZs better compete in a more technologically advanced industrial sector compared to
competitors located outside of IBZs with an inferiorly trained workforce. This scenario
would thus help explain why businesses located in IBZs were better able to stem job losses
compared to businesses located outside of IBZs.

This hypothesis highlights the need to evaluate the workforce development
programs that local development corporations offered to IBZ businesses. If it is the case
that industrial businesses indeed were better able to retain their industrial workforce as a
result of the IBZ workforce training programs, city officials might consider expanding these
workforce development programs to industrial businesses located outside of IBZs. Were the
city to extend these services to industrial businesses outside of IBZs, this gesture would send
the firm signal that the city is committed to retaining a critical supply of middle-class
industrial jobs even in areas beyond the IBZ program’s original geographic reach.

2. Conduct targeted outreach to nascent industrial businesses and highlight the
benefits of the Industrial Business Zone program.

Findings from this analysis have demonstrated that the IBZ program did not have a
meaningful impact on encouraging new industrial business registrations in IBZs. One
explanation of this finding is that newly registered industrial businesses were not aware of
the services offered as part of the IBZ program and therefore did not take advantage of the
program’s offerings. As such, IBZ program officials should consider conducting an audit of
their industrial outreach activities and evaluate whether the marketing of the IBZ program is
effectively reaching its intended audience.

As part of this process, IBZ program officials should consider surveying newly
formed industrial businesses to gain a better understanding of whether industrial businesses
were aware of the IBZ program offerings. To start, IBZ program officials might consider reaching out to industrial businesses that participate in the city’s industrial incubators and accelerators, such as BIOBAT at Brooklyn Army Terminal or Futureworks NYC. As a previous study of small-scale manufacturers in Chicago, New York City, and Portland illuminated, small-scale manufacturers working out of industrial incubators often face scale-up issues as their businesses ramp up production and outgrow limited space offered at industrial incubators (Doussard, Schrock, Wolf-Powers, Eisenburger & Marotta, 2017). Thus, such newly formed businesses in search of larger industrial space could benefit from learning about the IBZ’s service offerings and its efforts to provide greater real estate certainty to industrial users. In doing so, IBZ program officials might help create a clearer pathway for newly formed industrial businesses to locate within IBZs.

3. Include physical investments in industrial buildings (e.g. retrofits or renovations) as a criterion for drawing future Industrial Business Zone boundaries.

Since 2013, the IBZ Boundary Commission has identified six additional Industrial Business Zones throughout the city, with potentially more IBZs coming down the pipeline as the city experiences something of an urban manufacturing renaissance. While Section 22-626 of the City’s Administrative Code stipulates that the IBZ Boundary Commission should draw IBZ boundaries based on whether they “determin[e] that the market conditions in such zone are such that the availability of an industrial business zone tax credit is required in order to encourage industrial and manufacturing activity in such zone,” the administrative code does not require that the IBZ Boundary Commission explicitly consider the level of investment in industrial infrastructure (e.g. retrofits of industrial buildings) as a criteria for IBZ designation (New York City Administrative Code, 2006).
However, it would be prudent for IBZ program officials to consider industrial building investments as one criterion for establishing additional IBZs, as it could help to make the IBZ program more politically palatable. To date, critics of the IBZ program have charged that manufacturing is “dead” and that the IBZ program amounts to nothing more than smokestack chasing in a “post-industrial” city like New York (Cook, 2016). One way to push back on this sentiment could be to draw future IBZ boundaries around areas of the city that report high levels of capital investment in industrial physical infrastructure. In doing so, city officials could position the program as much as an industrial employment retention tool as a program that invests in a sector that has cascading impacts throughout the economy (since construction-related activities touch multiple sectors). The positive benefit of this approach is that the IBZ program might receive more broad-based political support beyond the industrial sector’s most ardent supporters—an important consideration given that the program is not insulated from future budget cuts.

4. Provide more administrative support to non-profits and mission-driven developers interested in applying for funding through the city's Industrial Developer Fund.

Launched in 2016, New York City’s Industrial Developer Fund provides capital to non-profits and other mission-driven developers interested in developing industrial space throughout the city. Industrial preservationists have long lauded mission-driven industrial organizations as paragons of equitable industrial development, as they can be more thoughtful about which tenants they choose to lease out their space to. For example, instead of leasing out their spaces to tenants that will best meet their bottom-line, mission-driven industrial developers can instead choose tenants based on considerations such as whether
the business will offer a large number of industrial jobs, actively recruits minority or women employees, or encourages sustainable manufacturing practices (Abello, 2018).

Although the recent establishment of the Industrial Developer Fund indeed reflects the city’s commitment to preserving urban industrial uses, critics have charged that the process for accessing the Industrial Developer Fund is onerous and costly, requiring multiple rounds of architectural designs, site plan reviews, and environmental impact analyses. As a result, only one industrial developer has taken advantage of the program to date (Abello, 2019). In order to strengthen the city’s commitment to the industrial sector, the city should consider providing additional resources to help potential developers navigate the byzantine process of applying for Industrial Developer Fund funding. If more mission-driven industrial developers are able to develop industrial properties throughout the city, it stands to reason that industrial businesses that continue to struggle with skyrocketing rents will have additional leasing options. With more leasing options, this could help to push back against the decline in industrial land and industrial employment that continued both inside and outside of IBZs documented in this paper.

5. Evaluate the effectiveness of proposed zoning in the North Brooklyn Industrial Business Zone and consider extending updated zoning to other IBZs.

In November 2018, the de Blasio administration unveiled its much-anticipated North Brooklyn Industrial Business Zone report, which proposes a new zoning framework to take effect in the North Brooklyn IBZ in the Greenpoint and East Williamsburg neighborhoods in Brooklyn. The report recommends a series of updates to the city’s zoning code to stymie industrial business displacement and the continued decline of industrial land. First, the report calls on the NYC Department of City Planning to reduce onerous parking and
loading requirements in the North Brooklyn IBZ, which have long thwarted industrial and manufacturing tenants that sought to expand but that had already met their density caps. Second, the report recommends that the updated zoning will ban nightclubs and concert venues, which can still locate as-of-right within IBZs but that often take up large industrial building footprints but that offer few industrial jobs. Finally, the report encourages the city to adopt zoning code changes that would incentivize industry by providing density bonuses to developers that preserved industrial space (Baird-Remba, 2018).

As a next step, the city should implement these proposed zoning changes and monitor the impact that the updated zoning has on future industrial employment and industrial business displacement in the North Brooklyn IBZ. If successful, the city might consider expanding these zoning controls to other IBZs throughout the city. This dynamic might help to push back on the continued decline of industrial land, which this analysis has shown has continued in both IBZs and non-IBZ areas. The South Brooklyn IBZ, which covers part of the Gowanus neighborhood, might benefit from similar zoning controls in particular, as Gowanus has experienced several of the same pressures from non-industrial uses as the North Brooklyn IBZ, with bowling alleys, shuffleboard clubs, and concert venues cropping up alongside industrial tenants in recent years.

6. Monitor the performance of vertical manufacturing design initiatives.

In 2018, the Brooklyn Navy Yard Development Corporation, the non-profit that manages the historic navy yard property in downtown Brooklyn, released a master plan to guide future development efforts. The master plan recommended that the Brooklyn Navy Yard encourage vertical manufacturing, an innovative design typology for industrial development that would integrate low- and high-impact industrial uses throughout multiple
zones in one building. According to the master plan, the first zone would include ground-level space for loading and parking, meeting the needs of high-impact manufacturers. The second zone would include multiple floors with high ceilings for “XL” manufacturing uses or uses that use heavy equipment in their production process. The final zone would be dedicated to lower-impact light-manufacturing spaces that could operate out of more office-like spaces with lower ceiling requirements (Budd, 2018).

One of the promising aspects of vertical manufacturing is that it encourages future industrial development to integrate space for different kinds of industrial users in one building. This point matters given that recent research has found that the majority of entrepreneurs of light manufacturing firms are well-educated (Wolf-Powers, Doussard, Schrock, Heying, Eisenburger & Marotta, 2017), and thus might be more likely to hire similarly-educated workers. Heavier manufacturing firms, on the other hand, have traditionally tended to employ people with limited formal educational credentials. In the interest of making room for manufacturers of all stripes and businesses that employ workers of different educational pedigrees in the city, vertical manufacturing could represent one design strategy to encourage more inclusive economic development in the industrial sector. As such, if vertical manufacturing is implemented at the Brooklyn Navy Yard, the city should evaluate how effective this design intervention has been at encouraging inclusive economic development and consider incentivizing vertical manufacturing initiatives elsewhere.
In one of her final public statements before her death in 2006, urbanist Jane Jacobs penned an open letter to the Bloomberg administration in response to the proposed rezoning of the industrial waterfront in Williamsburg to high-end luxury development (Zukin, 2010). In her letter, Jacobs implored the Bloomberg administration and the NYC Council to consider the Williamsburg community plan and highlighted the negative consequences associated with rezoning the neighborhood’s industrial waterfront to support luxury development, writing:

“What the intelligently worked out plan devised by the community itself does not do is worth noticing. It does not destroy hundreds of manufacturing jobs, desperately needed by New York citizens and by the city’s stagnating and stunted manufacturing economy. The community’s plan does not cheat the future by neglecting to provide provisions for schools, daycare, recreational outdoor sports, and pleasant facilities for those things. The community’s plan does not promote new housing at the expense of both existing housing and imaginative and economical new shelter that residents can afford. The community’s plan does not violate the existing scale of the community, nor does it insult the visual and economic advantages of neighborhoods that are precisely of the kind that demonstrably attract artists and other live-work craftsmen, initiating spontaneous and self-organizing renewal. Indeed so much renewal so rapidly that the problem converts to how to make an undesirable neighborhood to an attractive one less rapidly” (The Brooklyn Rail, 2006).

In the end, the City Council largely ignored Jacobs’ call to action and instead greenlighted the rezoning of the Williamsburg industrial waterfront to support high-end residential development (Zukin, 2010). This represented one of a series of gestures that continued to fuel the fire of industrial land decline and industrial employment losses throughout the city.

In the ensuing years, industrial preservationists called on the city to stem industrial land decline as a means to protect the city’s supply of industrial jobs. Contrary to what critics contended, industrial preservationists did not advance an overly romantic vision of industry’s future in the city. Instead, advocates acknowledged that the industrial sector had reached its crescendo long ago, but argued that the failure to stabilize the industrial sector would represent the city’s own undoing. As
Paul Parkhill, the director of the Greenpoint and Manufacturing Design Center once explained to a New York Times reporter, “The era of New York as a center of commerce with an active port and a lot of waterfront manufacturing, that's gone. But there are a lot of small manufacturers who cater to a market within New York City. Many of them are creative enterprises who need to be close to their market and employ people who live close by” (Gonzalez, 2005).

Advocates grounded their claims in the reality that the industrial sector offered well-paying jobs that have helped carve a pathway to the middle class, particularly for people of color, people without a bachelor’s degree, and immigrants. In rezoning industrial land to support retail or commercial development, advocates argued that low-wage retail jobs would replace high-wage ones as industrial businesses were “zoned out” of the city. This dynamic, advocates contended, would continue to exacerbate rising income inequalities, fueled in part by the erosion of the city’s middle-class job base.

The city’s 2006 Industrial Business Zone (IBZ) program sought to address some of these challenges by offering a series of incentives (tax credits, business support services, and workforce development programs) to attract and retain urban industry in designated areas throughout the city. As this analysis has documented, however, the program yielded mixed results. While the IBZ program proved to be effective as an industrial retention tool, it was not as effective as an industrial attraction tool, failing to live up to the program’s mandate both to “protect existing manufacturing districts and encourage industrial growth citywide” (New York City Economic Development Corporation, “NYC Industrial Business Zones,” n.d.).

Although this paper has outlined a series of city-specific recommendations to improve the overall industrial climate in NYC (Chapter 6), findings from this analysis are also relevant to cities that are considering implementing or have already implemented industrial preservation policies. First, cities that are considering implementing an industrial preservation policy should first consider
whether to focus on industrial retention or industrial attraction priorities. Given that this paper found that the IBZ program successfully met the former but not the latter objective, this finding raises the question of whether industrial preservation policies can concurrently meet industrial retention and attraction objectives. If city officials are set on industrial attraction priorities, they should evaluate whether their cities can realistically accommodate new industry. For example, one question that city officials might ask include: does the city have an ample building stock with decent freight access to truck routes and loading facilities, which have proven to be of limited quantity in central cities? (New York City Department of City Planning, “Industrial and Business Subarea, n.d.) If not, city officials might first focus on industrial retention priorities before incentivizing an industry whose physical space needs are often a deciding factor in their location preferences, no matter the incentive.

Second, findings from this analysis are also relevant to cities that have already implemented industrial preservation policies. The mixed performance of the IBZ program highlights the need for other cities to weigh in on the debate surrounding the overall utility of industrial preservation policies as land use and economic development planning tools. As this paper has discussed, minimal research in the literature has evaluated the performance of industrial preservation policies, potentially inhibiting cities from implementing industrial preservation policies best adapted to their local context and potentially making other cities reticent to adopt industrial preservation policies given the lack of consensus in the literature surrounding their effectiveness. This paper therefore issues a clarion call for other cities to adopt rigorous methods to evaluate the performance of already-enacted industrial preservation policies and to widely disseminate their findings to inform future policymaking. With more research on this topic, cities that have already implemented industrial preservation policies likely will benefit from best-practice sharing, enabling them to iterate on their current policies and better meet the needs of their industrial community.
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