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Do art galleries stimulate redevelopment?

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ABSTRACT

New York City is often held up as a successful example of arts-led economic development. Case studies have documented the influx of avant-garde artists and galleries into several neighborhoods, including Greenwich Village, Soho, and Chelsea, followed by yuppies and boutiques. Some researchers have used these examples to argue that artists and galleries can spur gentrification. An alternative hypothesis is that galleries choose to locate in neighborhoods with high levels of amenities. In this paper, I examine whether concentrations of galleries in Manhattan are associated with redevelopment of surrounding neighborhoods, conditional on initial neighborhood amenities. Results indicate that new galleries locate in high amenity, affluent neighborhoods, and near existing star galleries. In simple bivariate regressions, star gallery density is positively correlated with several metrics of building change. However, these correlations diminish when controls are added for initial neighborhood physical and economic conditions, and weaken still further under an IV approach. Results are consistent with galleries selecting neighborhoods that have a higher propensity to redevelop, due to the presence of observed and unobserved amenities.

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1. Introduction

A popular local economic development strategy is to offer incentives to artists, galleries, and other cultural activities that locate in neighborhoods designated as "Arts Districts". As of 1998, nearly 60% of the 150 largest U.S. cities had at least one designated cultural district (Frost-Krumpf, 1998; Noonan and Breznitz, 2013). The civic and commercial associations that promote visits to these districts often highlight the physical landscape of the neighborhoods as a key feature, specifically their location in formerly industrial areas and the adaptive reuse of loft buildings, converted from warehouses and factories.[1] Advocates of place-based subsidies for the arts argue that reusing industrial spaces for arts and culture can lead to physical and economic regeneration of blighted neighborhoods (see, for instance, Cameron and Coaffee, 2005; Florida, 2002a, 2002b; Markusen and Schrock, 2006). Case studies have documented the entry of artists and arts-related activities into previously undesirable neighborhoods which subsequently gained in economic and social status in a number of cities, including London (Cameron and Coaffee, 2005), Toronto, Montreal and Vancouver (Ley, 2003), Hoboken, Jersey City and Newark (Cole, 1987), and Chicago (Cole, 1990). New York City is held up as one of the most successful examples of arts-led economic development: over the past half-century, concentrations of avant-garde artists and galleries have formed in the previously sketchy but now trendy neighborhoods of Greenwich Village, Soho, the East Village and Chelsea (Halle and Tiso, 2014; Molotch and Treskon, 2009; Zukin, 1989; Zukin and Braslow, 2011). However, the prior literature on this topic has two main limitations. Most studies describe the trajectory of one or two neighborhoods, but lack any counterfactual to establish what would have happened in the absence of artists. Moreover, these studies are often imprecise about what type of cultural venues or activities are related to neighborhood change, and by what mechanisms they create change. This paper improves on the current literature in several ways. I focus on one clearly defined, well measured type of cultural venue, galleries that sell original artworks. Using data on all Manhattan city blocks from 1991 to 2004, I compare changes in building stock across neighborhoods with varying exposure to galleries, and attempt to distinguish factors that attract galleries to certain locations from potential transformative impacts on surrounding neighborhoods.

Most prior studies that link artistic activities or venues to economic development focus on the role of artists' homes and studios.

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[1] Although zoning and building code definitions vary by city, "loft" buildings are generally classified as buildings with an absence of interior walls that create divisions between rooms. Loft buildings may also expose structural elements, such as ceiling beams and cinder-block or brick walls, and typically have high ceilings and large windows.

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Because artists tend to have relatively low incomes, they are presumed to seek out low-rent neighborhoods in which to live and work (Cameron and Coaffee, 2005). Sociologists and geographers have also suggested that artists seek "authentic" neighborhoods, characterized by socioeconomic diversity and tolerant attitudes (Ley, 2003), as well as distinctive physical attributes, including "run-down areas with old factories and warehouses" (Cole, 1987). The mechanisms by which artists' homes and studios are believed to "set off a process of increased property values and displacement" are somewhat sketchily laid out (Zukin and Braslow, 2011). Cole (1987) identifies some direct spillovers, such as when artists patronize neighborhood retailers for supplies. He also suggests that "artists add flair" and that "use of artists and the arts to glamorize an area…is a strategy for real-estate speculation". Ley (2003) predicts that artists will attract a succession of gradually more affluent residents, although does not specify why or how this will occur. An unfortunate barrier to large-scale quantitative research on economic development associated with artists' homes and studios is the difficulty of obtaining data on artists' locations. Markusen (2004) points out that surveys miss many artists whose primary income derives from non-artistic jobs (the proverbial actor-waiter). Datasets with detailed breakdowns of occupation and industry, such as the Current Population Survey, only allow counts of artists at the state or MSA level.

Besides artists' residences, several studies highlight the importance of art galleries as convening places for artists, dealers, and other players in the artistic social scene (Cole, 1987; Currid, 2007; Molotch and Treskon, 2009; Halle and Tiso, 2014). Galleries have the potential to draw culturally-oriented visitors to a neighborhood, which may create greater interest in the neighborhood as a residential or retail location (Cole, 1987). Still other studies examine the role of large cultural institutions, such as museums or performing arts spaces (NEA, 1981; Strom, 2002; Scott, 2004). Discussions of the "creative class" and economic growth often group visual artists, writers, and performers with other "creative" occupations and industries, including architects and graphic designers (Florida, 2002a). In practice, many public policies that incentivize the arts cover a wide range of activities related to artistic production and consumption. For instance, the 2008 rezoning of Harlem's 125th Street gave preference to "Arts and Entertainment-Related Uses", including museums, galleries, performance spaces, bookstores, nightclubs, music stores, and restaurants.[2] All these venues can be described as cultural activities, but it is unclear whether they will attract similar consumers, choose the same locations or will generate similar spillover effects on neighborhoods. To date, no studies have systematically tried to compare the impacts of different cultural venues or activities in the same empirical setting.

Another major limitation of prior studies is the inability to control for potential selection bias in subject neighborhoods. Do arts-related activities cause gentrification, or do they choose to locate in neighborhoods that are more likely to attract high-income residents and commercial activity even without bohemian intermediation? To understand the location choice of art galleries, the focus of this study, I draw on theories of agglomeration economies in retail markets. Retailers selling expensive, quality-differentiated products, such as antique dealers and jewelers, often cluster together in order to lower consumer search costs (Dudey, 1990; Eaton and Lipsey, 1979; Fischer and Harrington, 1996; Picone et al., 2009; Stahl, 1982; Wolinsky, 1983). Schuetz and Green (2014) find that new art galleries in Manhattan are more likely to open in census tracts with existing gallery concentrations, more affluent households and older, more expensive housing. Peterson (1997) found that Parisian galleries clustered in four major art districts – the Rive Droit, the Rive Gauche, Beaubourg, and the Bastille – each of which specialize by period or artistic style. Qualitative research offers several hypotheses for galleries' spatial concentration, and for the location of specific gallery clusters. Studies posit that galleries moved to Soho in the 1970s because of social links between resident artists and gallery owners, especially in the case of "star" art dealers (Currid, 2007; Halle and Tiso, 2014; Zukin, 1989). Florida (2002a, 2002b) also stresses social networks and institutions, such as cafes and nightlife venues, in attracting the "creative class" more generally. Galleries' presence in both Soho and Chelsea has been linked to the building stock composition, specifically the presence of large industrial buildings (Molotch and Treskon, 2009; Shkuda, 2010).

Gentrification of neighborhoods such as Soho, the East Village and (to a lesser extent) Chelsea, has been tied to artistic activity (Halle and Tiso, 2014; Molotch and Treskon, 2009; Zukin, 1989). While gentrification is often defined in terms of population change, such as shifts in socio-economic characteristics or racial/ethnic composition, the literature on arts-led regeneration also stresses physical changes.[3] Specific outcomes highlighted include shifts in land use away from lower-valued industrial space towards housing and retail activity, physical rehabilitation of low-quality buildings, and eventually new development.

This paper tests an alternative conceptual framework proposed by Brueckner et al. (1999), which stresses the importance of exogenous, fixed-location amenities.[4] Brueckner et al. define a set of urban amenities that are plausibly exogenous to current economic conditions: natural amenities such as waterfronts and hills, and historical amenities developed in prior eras such as monuments, historic buildings, and parks.[5] By contrast, amenities such as restaurants, shops and school quality are endogenous to neighborhoods' current socioeconomic composition. If high-income households seek out amenity-rich neighborhoods, then both types of amenities will be positively correlated with current neighborhood income, but exogenous amenities can be used to determine causality of gentrification. The intuition is similar to filtering models, in which high-income households redevelop or rehabilitate older housing in centrally located neighborhoods to reduce transportation costs (Brueckner and Rosenthal, 2009; Helms, 2003; Rosenthal, 2008). This theory implies that if galleries choose to locate in neighborhoods with low current rents, but with high levels of exogenous amenities, subsequent gentrification may either be the result of galleries themselves or the attraction of high-income households and mainstream commercial activity to the exogenous amenities.

Certain amenities may be particularly attractive to galleries. As an industry that prizes aesthetics, gallery owners may place a premium on high quality or distinctive architecture. Galleries may value being near museums or other cultural institutions. Building dimensions may also be important: galleries that display very large artworks may require large, open floorplan rooms or high ceilings. As commercial establishments, galleries may face zoning constraints in where they can operate. If galleries benefit from agglomeration economies, they will prefer to locate in neighborhoods with other galleries, particularly those owned by "star"

[2] NYC Department of City Planning. 125th St proposal http://www.nyc.gov/html/dcp/html/125th/125th6zp.shtml.

[3] Studies of neighborhood change that focus on changes in demographic and economic characteristics of the population include Bostic and Martin (2003), Ellen and O'Regan (2008) and McKinnish et al. (2010).

[4] See Koster et al. (2012) for an empirical test of the role of exogenous amenities in gentrification of European cities.

[5] Brueckner et al. acknowledge that renovation of older neighborhoods may enhance historic amenities, but do not discuss the possibility that downward filtering of amenity-rich neighborhoods could diminish amenity values through neglected maintenance.

dealers that attract wealthy art collectors. Many retailers seek out transportation hubs for better access to customers, but it is unclear whether luxury retailers are dependent on casual traffic.

In this paper, I examine whether proximity to galleries is associated with physical redevelopment in Manhattan from 1991 to 2004. Manhattan offers a rich empirical setting; during the study period, roughly 800–1000 galleries per year operated in Manhattan, more than twice as many as in any other U.S. city.[6] To determine how galleries select locations, I estimate regressions of the number of newly opening galleries on each city block as a function of proximity to existing galleries and amenities such as historic architecture, museums and parks, as well as socioeconomic characteristics, land use patterns and building characteristics. To assess whether galleries are correlated with redevelopment, I regress changes in the building stock and land use patterns for each city block against the initial concentration of galleries, controlling for observable amenities that may affect galleries' location choice. If galleries choose blocks with unobserved amenities, such as high-end shops and restaurants, OLS estimations may overstate galleries' impact on redevelopment. To reduce this endogeneity problem, I use an instrumental variables approach, predicting current gallery density from historic star gallery locations and proximity to historically high-income census tracts. Gallery clusters, which tend to form in high-income neighborhoods, exhibit strong persistence over time. Results show that 1970 star gallery locations and proximity to high-income census tracts in 1970 strongly predict star gallery density in the 1990s and early 2000s. However, 1970 neighborhood characteristics are unlikely to exert direct influence over development patterns during the more recent period.

Results suggest that new galleries choose to locate in neighborhoods with higher levels of exogenous amenities. More new galleries open on blocks with pre-1940 housing, close to museums and parks, with commercial-friendly zoning and higher household income. Proximity to prior "star" galleries is strongly predictive of new gallery openings. Results provide little evidence that proximity to star galleries is correlated with neighborhood redevelopment. Bivariate OLS specifications show a positive correlation between initial star gallery density and the rate of building transition, gains in residential and retail land shares, and aggregate building quantity. However, these correlations are not robust to adding controls for initial physical and economic conditions and neighborhood-year fixed effects. The estimated magnitude and significance drop still further in IV estimates, when current gallery density is predicted using lagged gallery locations and proximity to historically high-income census tracts. These results suggest that star galleries choose locations that subsequently undergo more transition, but redevelopment is due to observable and unobservable amenities, rather than galleries themselves.

The remainder of this paper is organized as follows. Section 2 describes the data on galleries and provides some context for gallery neighborhoods. Sections 3 and 4 describe other data sources and the empirical strategy. Section 5 presents results and Section 6 concludes.

2. Context of Manhattan galleries

Examining Manhattan gallery location patterns and characteristics of gallery districts reveals some interesting facts. Galleries are highly concentrated in space, and gallery clusters are quite persistent over time. Both star and non-star galleries tend to locate in neighborhoods with affluent residents and high levels of physical amenities. During the 1990s, census tracts with galleries experienced more income gains than tracts without galleries, conditional on initial income, but not controlling for initial physical amenities.

2.1. Manhattan Gallery Database

Longitudinal data on the location of art galleries comes from the Manhattan Gallery Database, compiled from Yellow Page listings from 1970 to 2003. The Yellow Pages list names and addresses of all establishments that identified themselves as "Art Galleries"; this category includes businesses that sell original artworks for profit, and excludes museums or private collections that display art but do not generally sell it. Gallery names are linked across annual files to create a longitudinal dataset, so that opening and closing dates of establishments can be determined. Street addresses are geocoded and matched with unique parcel ID numbers in order to merge them with New York City administrative datasets, described in Section 3.[7]

Unfortunately the Yellow Pages do not provide information such as the genre or type of art sold, number of employees or revenues.[8] Thus there is likely to be considerable heterogeneity among the galleries included in the database. Most galleries that sell to serious collectors rotate their exhibits twice yearly, with spring and fall traditionally being the seasons for new exhibit openings.[9] The only observable difference between galleries is their "star" status. Art history scholars and sociologists have written about the importance within the art market of a few well-known dealers who act as "gatekeepers", promoting new artists and hosting exhibitions that influence the overall market (Bystryn, 1978; Peterson, 1997). In this paper these dealers' establishments are referred to as star galleries. To identify stars, gallery names from the Yellow Pages were matched with listings in contemporaneous New York City tourist guidebooks (Fodor's and Frommer's Guides). The earliest guidebook mentions "arty and social types milling around ... the better [galleries] clustered near Madison Avenue in the 50's, 60's and 70's", as well as "numerous interesting and newly founded galleries" in Soho and Greenwich Village, but does not mention any specific names (Fodor's, 1974). From 1977 to 1993, the guidebooks list individual gallery names as part of neighborhood walking tours. From 1998 onward, the overall city "Shopping" chapter contains a separate heading for art galleries. There is generally some lag between a gallery's opening year derived from the Yellow Pages and its first mention in a tourist guidebook, either because guidebooks are infrequently updated or because it takes time for galleries to establish a reputation. Approximately 25% of the galleries that will ever be identified as stars are mentioned in a guidebook within five years of their opening date, and 60% are mentioned within 10 years (the latter group includes many galleries that date from the early 1970s and show up in the first guidebook listing in 1977). Any gallery that is ever mentioned in a guidebook is flagged as a star for its duration in the Manhattan Gallery Database; a total of 86 firms, or about 2% of all galleries operating between 1970 and 2003, are identified as stars. Star galleries attract more visitors and media attention than non-stars, and so should have more influence on their neighborhoods' subsequent development.

[6] The count of Manhattan galleries comes from the Manhattan Gallery Database, gallery counts for other U.S. cities were taken from the Census Bureau's County Business Patterns (galleries and art dealers, NAICS 453920).

[7] For more detailed discussion of the Manhattan Gallery Database, see Schuetz and Green (2014).

[8] The gallery names do not provide much insight into quality or type of art sold. Most commonly, galleries are named after the founding dealer or the gallery address; other gallery names are similarly uninformative. Data from the publicly available ZIP Business Patterns suggest that three-quarters of galleries have fewer than four employees, a number that has been fairly stable over time.

[9] Notable exhibit openings are covered by art critics in general media; see Smith (2014) for a recent example.

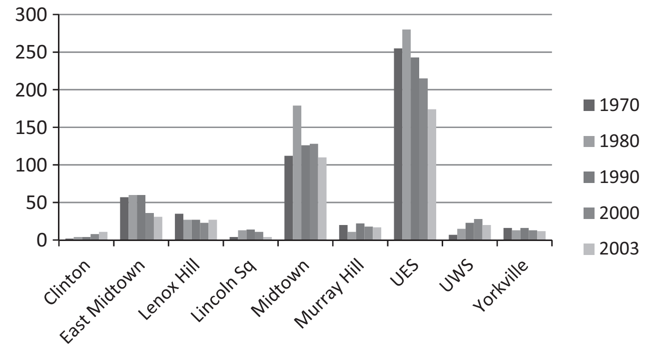

Fig. 1. Galleries in Uptown neighborhoods, 1970–2003. *Source:* Manhattan gallery database.

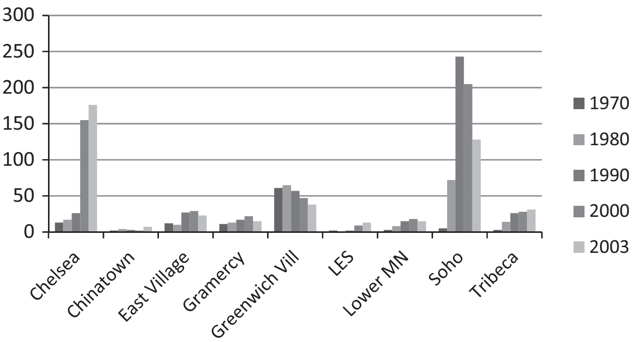

Fig. 2. Galleries in Downtown neighborhoods, 1970–2003. *Source:* Manhattan gallery database.

2.2. Descriptive statistics: Manhattan gallery neighborhoods

Historically, Manhattan has had important art markets both Uptown and Downtown.[10] Galleries have located in the Uptown neighborhoods of Midtown and the Upper East Side since the 1940s, when the rise of Abstract Expressionists brought New York to prominence in the international art world (Bystryn, 1978). While about 70% of Uptown galleries are located in these two neighborhoods, smaller clusters have persisted in East Midtown and Lenox Hill (Fig. 1). The first Downtown gallery cluster formed in Greenwich Village during the 1960s and 1970s. Soho emerged as a Contemporary art center in the 1970s, while Chelsea saw tremendous growth in the mid-to-late 1990s (Halle and Tiso, 2014). As of 2003, 68% of Downtown galleries were in Soho and Chelsea, with small clusters in Greenwich Village, the East Village and Tribeca (Fig. 2). The number of Uptown galleries peaked at just over 600 in 1983 and has since been declining, while Downtown galleries grew steadily from about 100 in 1970 to over 500 in 2001 (Fig. 3). In general, Downtown galleries tend to specialize in Contemporary art, including works by living artists, and are considered part of the avant-garde art scene. Uptown galleries are known for selling artworks from ancient times through mid-20th century (Molotch and Treskon, 2009). Since 1970, fewer than twenty galleries per year, and no star galleries, have existed in the Far Uptown neighborhoods north of Central Park, therefore this region of Manhattan is excluded from the study.

Researchers have suggested that artists tend to live in low-rent, socially marginal neighborhoods. By contrast, galleries are essentially luxury goods retailers, so may prefer to locate in more affluent neighborhoods. Comparing economic characteristics of census tracts with galleries to those without, using census data from 1970 to 2000, supports this hypothesis (Table 1). On average, tracts with at least one gallery have higher average household income, higher population shares with college or professional degrees, and higher average rents.[11] The economic differences between gallery and non-gallery tracts are similar for avant-garde Downtown neighborhoods as well as the more established Uptown neighborhoods. Downtown gallery tracts have lower population densities than non-gallery tracts, while Uptown gallery tracts have higher population densities. The population and economic patterns are even more pronounced for tracts with at least one star gallery: stars locate in less dense, more affluent, higher rent tracts than non-star galleries.

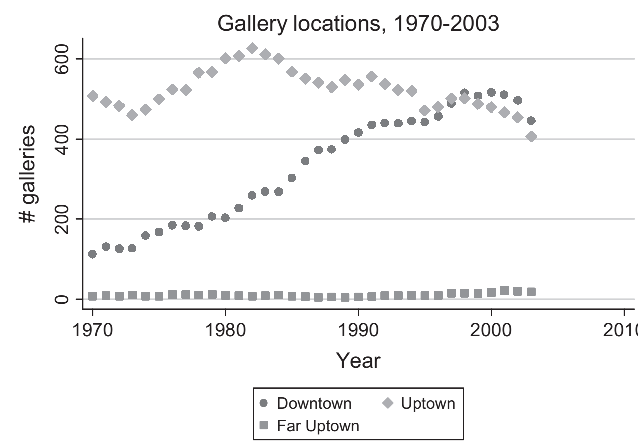

Fig. 3. Changes in Manhattan gallery locations, 1970–2003. *Source:* Manhattan gallery database.

Because these are cross-sectional comparisons, it is unclear whether galleries initially chose to locate in affluent tracts, or whether galleries opened in initially disadvantaged areas that subsequently gained in economic status. As a simple test, I regress 10-year changes (1970–80, 1980–90, 1990–2000) for each outcome against a binary indicator of whether at least one gallery was present in the tract at the beginning of the decade, controlling for the initial levels of population density, income, education and rent. Table 2 shows the coefficients on the gallery indicator variable. Pooling all three periods, the results show that tracts with at least one gallery had significantly larger gains in college-educated population shares and rent, and marginally significantly larger gains in income, relative to non-gallery tracts. Disaggregating estimates by period shows that these gains are mostly evident in the most recent period, 1990–2000 (rent change is marginally significant in 1980–1990 also).[12] These results are not consistent with gentrification of gallery-rich neighborhoods in the 1970s and 1980s, such as Midtown, the Upper East Side, Greenwich Village and Soho. But Chelsea's growth in galleries occurred during the late 1990s, concurrent with income and rent growth among gallery tracts. Alternatively, the

[10] This paper uses four geographic levels. The smallest, and primary unit of analysis, is the city block. The next largest is census tract; each of Manhattan's 281 tracts contains approximately seven city blocks. Neighborhoods are taken from NYC Department of City Planning, which has aggregated contiguous groups of census tracts that correspond to colloquial neighborhood names (i.e. Soho and Midtown). There are 29 Manhattan neighborhoods, containing 2–18 census tracts, or 4–125 city blocks. Neighborhoods are grouped into three regions: Downtown contains neighborhoods south of 30th Street (the northern border of Chelsea), Uptown contains neighborhoods between 30th Street and 110th Street (the northern border of Central Park), and Far Uptown is north of 110th Street (and above 96th St on the east side of Central Park).

[11] Table 1 presents pooled data from all census years, 1970–2000, taken from the Neighborhood Change Database. Results for separate years are substantively similar.

[12] For tract-level regressions, including an indicator for presence of star galleries is not meaningful because of the very small number of tracts with any stars.

Table 1
Economic characteristics of gallery census tracts, 1970–2000.

	Galleries	No galleries	Difference	Stars	Non-stars	Difference
All Manhattan						
Pop/sq mi	83,335	84,495	−1160	63,316	86,015	−22,699***
Income	95,981	50,420	45,561***	146,209	89,315	56,894***
BA+ (%)	51.67	29.71	21.96***	56.33	51.06	5.27**
Rent	980.39	609.48	370.91***	1132.50	960.16	172.34***
n=	495	221		58	437	
Downtown						
Pop/sq mi	68,168	89,018	−20,850***	60,879	69,286	−8407
Income	72,607	42,743	29,864***	88,229	70,210	18,018**
BA+ (%)	48.46	22.04	26.42***	58.79	46.87	11.93***
Rent	876.27	502.60	373.66***	1025.31	853.27	172.04**
n=	203	117		27	176	
Uptown						
Pop/sq mi	93,913	79,407	14,506**	65,439	97,295	−31,856***
Income	112,231	59,057	53,174***	196,707	102,198	94,510***
BA+ (%)	53.90	38.12	15.78***	54.19	53.86	0.33
Rent	1052.42	729.72	322.71***	1225.86	1031.83	194.03***
n=	292	104		31	261	

Notes: Tract-level averages pooling data from 1970 to 2000. Tracts are classified as having one or more galleries (stars) at the beginning of the decade, using the Manhattan Gallery Database. Decennial census data on population density, average annual household income, educational attainment and average monthly rent from Neighborhood Change Database. Income and rent are adjusted to constant 2000 dollars.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Table 2
Tract-level economic change, by initial gallery presence (1970–2000).

	Pop change	Income change	BA+ change	Rent change
All years	62.86	3990.0*	2.548**	50.99**
	(101.1)	(2237)	(1.033)	(20.94)
1970–1980	303.1	−712.80	3.659	31.57
	(315.2)	(1974.00)	(2.34)	(21.20)
1980–1990	−131.7	6506.00	1.76	70.99*
	(140.2)	(4320.000)	(1.427)	(40.42)
1990–2000	78.56	6148.0***	2.326*	59.71*
	(102.2)	(1986)	(1.234)	(29.11)

Notes: Dependent variables are changes in population, average household income, college educated population share, and average rent (1970–80, 1980–90, 1990–2000). The first numbers in each cell are coefficients on binary indicator of initial gallery presence in the census tract (1970, 1980, 1990). Regressions include controls for log(population density), log(income), college educated share, and log(rent) in baseline year. Robust standard errors, clustered by neighborhood, in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

economic premium attached to galleries may have increased in recent years.

Comparing physical characteristics of neighborhoods provides further evidence that galleries choose desirable locations. Table 3 summarizes access to several amenities, calculated for each Manhattan block: the share of land in historic districts and the share of pre-1940 buildings (proxies for architectural style and quality), as well as proximity to museums, parks, and subway stations.[13] Blocks with at least one gallery have more land in historic districts and more pre-1940 buildings. Historic district designation indicates unusual and noteworthy architecture, but can encompass a wide variety of styles and periods of origin. For instance, many Upper East Side galleries are housed in 19th century rowhouses that were originally residential structures. About 80% of Soho's galleries fall within the Cast Iron Historic District, notable for high-ceilinged and large-windowed structures originally built for manufacturing and now adapted for residential, retail and office space (Shkuda, 2010). Photos of galleries in buildings typical of these neighborhoods are shown in Appendix Figs. 1–4. Gallery blocks are also closer to major museums, particularly Uptown, which is home to several prestigious museums (the Metropolitan Museum of Art, the Guggenheim and the Frick on the Upper East Side, and the Museum of Modern Art in Midtown). In both regions, gallery blocks are closer to parks and subway stations. Uptown galleries are clustered along 57th Street, two blocks south of Central Park, and along Madison Avenue, one block east of Central Park. Many of Chelsea's galleries cluster along Tenth Avenue, underneath and adjacent to the High Line Park, which was created from a disused elevated rail line.[14]

Proximity to amenities is also apparent when comparing star gallery blocks to non-star gallery blocks. The historic district land shares for star gallery blocks are particularly high: 75% for blocks Downtown and 69% Uptown, compared to 30% for Manhattan overall. Downtown star gallery blocks are somewhat farther from museums and subway stations than non-star gallery blocks. Among Uptown blocks, star blocks are located on average 0.35 miles to a major museum and 0.16 miles to major parks. Maps showing the proximity of galleries to historic districts, parks, museums and subways for several neighborhoods can be found in Appendix Figs. 5–8.

Collectively, these descriptive statistics suggest that galleries tend to locate in affluent, high amenity neighborhoods. Thus these factors must be controlled for when considering the possible impact of galleries on neighborhood redevelopment.

3. Additional data sources

The analysis combines several data sources to capture spatial patterns of galleries and the physical and economic characteristics of Manhattan neighborhoods. Table 4 provides variable definitions, Table 5 shows summary statistics. The analysis covers the period from 1991 to 2004, due to data availability, and is conducted at the city block level. Because galleries are small establishments, is

[13] Data on building age and historic district status comes from NYC administrative data, distance measures from block centroid to museums, parks and subway stations were calculated by GIS. More details on variable sources and definitions are provided in Section 3 and Table 4.

[14] Halle and Tiso (2014) offer an extensive discussion of Chelsea's recent history, including the in-migration of galleries and development of the High Line Park.

Table 3
Physical amenities of gallery neighborhoods (1990–2003).

	Galleries	No galleries	Difference	Star	Non-star	Difference
All Manhattan blocks						
Historic district (%)	48.08	28.90	19.18***	72.34	45.83	26.51***
Pre-1940 bldgs (%)	82.87	68.34	14.53***	85.49	82.63	2.86
Museum distance	0.53	0.62	−0.08***	0.51	0.53	−0.03
Park distance	0.43	0.59	−0.16***	0.27	0.44	−0.17***
Subway distance	0.26	0.30	−0.05***	0.27	0.25	0.02
n=	1556	2685		132	1424	
Downtown						
Historic district (%)	57.15	36.23	20.92***	75.01	55.21	19.80***
Pre-1940 bldgs (%)	86.26	66.93	19.33***	86.92	86.19	0.73
Museum distance	0.56	0.58	−0.02**	0.63	0.55	0.09***
Park distance	0.45	0.67	−0.22***	0.35	0.46	−0.11***
Subway distance	0.21	0.26	−0.05***	0.25	0.21	0.04***
n=	756	1412		74	682	
Uptown						
Historic district (%)	39.51	20.82	18.69***	68.94	37.21	31.73***
Pre-1940 bldgs (%)	79.67	69.91	9.76***	83.67	79.35	4.31
Museum distance	0.51	0.66	−0.15***	0.35	0.52	−0.18***
Park distance	0.40	0.49	−0.09***	0.16	0.42	−0.26***
Subway distance	0.30	0.35	−0.05***	0.30	0.30	0.00
n=	800	1279		58	742	

Notes: Averages for city blocks, with and without galleries (Manhattan Gallery Database). Gallery (Star) columns include only blocks with at least one gallery (star). Historic district status and building age from NYC Department of Finance (RPAD). Distance to major museums, parks and subway stations calculated from each block centroid to nearest amenity using GIS.

seems likely that any effects will be strongest in the immediate vicinity.

Gallery presence and density are measured in several ways, using the Manhattan Gallery Database. Counts of newly opened galleries per city block are calculated over three-year periods. The density of galleries per block at a point in time is captured through nearest-neighbor indices. Using the latitude-longitude coordinates, I calculate the average distance from each block centroid to the five nearest galleries and three nearest star galleries, as shown in Eq. (1) (Clark and Evans, 1954; Dixon, 2001; Fischer and Harrington, 1996).[15] These indices offer some advantages over using simple counts of galleries or stars located on a block. The number of galleries per block is highly skewed, with 80% of blocks having zero galleries but a few blocks having many galleries. The distance indices provide a smoother and more approximately normal distribution than gallery counts. The indices also allow me to distinguish between a block with zero galleries but across the street from a block with many galleries, and a block with zero galleries whose adjacent blocks also have zero galleries. For ease of interpretation, gallery and star nearest neighbor indices are normalized by their respective standard deviations and the direction of the index is inverted so that higher index values indicate higher gallery (star) density.

Data on land use patterns and building characteristics are assembled from two New York City administrative datasets, the Department of Finance's Real Property Assessment Database (RPAD) and the Department of City Planning's Primary Land Use Tax Lot Output (PLUTO). Each parcel is identified by unique ID number; I match parcel IDs across four annual files (1991, 1996, 2000 and 2004) to create a longitudinal dataset. These data are used to measure levels and changes in building stock and land use. Key variables include land use type, zoning classification, building size and age. Land use shares are calculated for seven categories: residential, retail, loft, office, industrial, vacant, or miscellaneous. A Herfindahl index, based on these values, measures land use diversity.[16] I also calculate each block's land share zoned for retail activity, either by primary zoning classification or commercial overlay. Building size indicators include average lot size and average number of stories per structure (ideally I could observe characteristics such as high ceilings and open floor plans, but no data is available on these features).

Two proxies for architectural style and quality are created. The first is construction vintage: pre-World War II buildings generally command a premium in New York real estate markets because of their design characteristics. The second is inclusion in an historic preservation district, which is intended to protect buildings or neighborhoods that have architectural, historic or cultural significance.[17] Historic district status imposes additional requirements for demolition or alteration, particularly exterior building changes, but does not prohibit changes in land use or interior building configuration. For instance, nearly all of Soho's Cast Iron Historic Buildings were converted from their original purpose after the district's designation in 1972, often involving substantial interior reconfiguration and renovation (Landmarks Preservation Commission, 1973). Research has suggested that historic designation can create a price premium (Coulson and Leichenko, 2001). Although inclusion in an historic district does not guarantee that buildings are of higher architectural quality, historic district status likely signals distinctive – if not more attractive – aesthetics. I identify whether each block contains any designated historic buildings in a given year (in most cases, the entire block is included or excluded).

Measuring redevelopment in a highly dense, relatively old environment like Manhattan raises some challenges. Broadly speaking, three types of changes can occur. The quantity of building stock can increase or decrease through new development, redevelopment or demolition. Existing buildings may be converted to different land uses, such as conversion from commercial to residential. Existing buildings may also be altered in size, through adding extra stories or reconfiguring the interior to include more or fewer units (for instance, subdividing townhouses into multiple apartments). Illustrations of several types of changes are shown in Appendix Table 1. Because of Manhattan's density and complex development process, development of new buildings may be a relatively small share of total changes in building stock (Glaeser et al., 2005). Therefore I construct metrics of all three types of change.

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15 Gallery density index is calculated as: Gall density $= \frac{\sum_{j=1}^{n} \mathrm{Min} d_{ij}}{n}$. In this equation, d_{ij} is the pairwise distance between each block centroid (i) and all galleries (j) that exist in the same year. Results using other values for n are quite similar. Results using simple count variables are similar but statistically weaker than using indices.

16 The Herfindahl index is calculated as follows: $Herf = \sum_{i=1}^{n} \frac{Area_i^2}{Area}$.

17 http://www.nyc.gov/html/lpc/html/about/about.shtml.

Table 4
Variable definitions and sources.

Variable name	Definition	Source
Gallery metrics		
New galleries	# of new galleries per block	Manhattan Gallery Database (1970–2003)
Gallery density	Inverse avg dist to 5 nearest galleries	
Star density	Inverse avg dist to 3 nearest star galleries	
Amenities		
Historic district	=1 if any land in historic district, =0 otherwise	Furman Center (2010)
Pre-40 bldgs	% structures built prior to 1940	RPAD/PLUTO (1991, 1996, 2000, 2004)
Museum dist	Avg distance to 3 nearest museums	Rough Guide to NYC (2006)
Park dist	Distance to nearest major park	ArcGIS shape files
Subway dist	Avg distance to 3 nearest subway stations	NYC Open Data
Avg income	Avg household income (inverse dist-weighted)	Census (1990, 2000)
High-income dist	Distance, nearest high-income tract	
BA plus	% Population w/ BA or graduate degree	
Rent	Avg monthly rent	
Land use & building characteristics		
Comm zoning	% land zoned for retail	RPAD/PLUTO (1991, 1996, 2000 & 2004)
Land use diversity	Herfindahl index, land use diversity	
Residential	% residential land	
Retail	% retail land	
Loft-industrial	% loft and industrial land	
Hsg units	# residential units	
Lot size	Average lot size (square feet)	
Stories	Average stories/building	
Building change metrics		
Any change	% of parcels with any alterations	RPAD/PLUTO (1991, 1996, 2000 & 2004)
Residential change	pp change, residential land share	
Retail change	pp change, commercial land share	
Story change	Change in total number of stories	

The primary metric is the percent of parcels per block that undergo alteration during each time period (1991–1996, 1996–2000, 2000–2004).[18] Several parcel characteristics – land use, lot size, number of buildings, stories, and residential units – are compared across subsequent years to identify whether parcels that have undergone any change.[19] The percent of altered parcels per block captures the widest range of building changes, and can be interpreted as the rate of transition or churn in the built environment. If galleries are indeed catalysts for economic or social change, then gallery blocks should be more dynamic, and exhibit high rates of building transition. The literature also suggests that artistic venues cause neighborhoods to shift from industrial uses or vacant buildings towards mainstream residential and retail activity, therefore I also examine changes in blocks' residential and retail land shares. The final building change metric is the change in aggregate stories for the block (summed across all structures). If galleries raise nearby property values, the quantity of building stock should increase.[20]

The analysis tests for the importance of physical amenities suggested by Brueckner et al. (1999): cultural institutions, parks, and transportation infrastructure. Data on the location and opening years of museums were assembled from the *2006 Rough Guide to New York* and various museum websites. The geocoded location of all Manhattan subway stops was obtained from the New York City Open Data website.[21] Using latitude and longitude coordinates, I calculate nearest neighbor indices from each block centroid to the three nearest museums and subway stations. Although many museums have existed in the same location over the entire study period, five museums in the sample opened after 1990, and several others relocated during this time. The number and location of subway stations does not change over time. GIS shapefiles were used to calculate the minimum distance from each block to the nearest major park boundary: Bryant Park, Central Park, The High Line, Hudson River Park, Madison Square Park, Morningside Park, Riverside Park, and Washington Square.[22]

Finally, the analysis includes data on population characteristics from the Neighborhood Change Database, which provides decennial census data from 1970 to 2000 for geographically constant tract boundaries. Manhattan census tracts contain roughly seven city blocks. To approximate block-level measures, I calculate inverse distance-weighted averages for three key variables: average household income, population share with college or graduate degree, and average rent. The formula for calculating block-level metrics is shown below:

$$\sum_{j=1}^{n} X_j * \frac{1}{dist_{ij}^2} \qquad (1)$$

where X_j is the tract-level socioeconomic variable, $dist_{ij}$ is the linear distance between the city block centroid (i) and the census tract centroid (j). This formula allows socioeconomic measures to vary across blocks in the same tract, based on proximity to neighboring tracts with different values, and assigns higher weight to the closest

[18] Comparing numbers of building permits issued with certificates of occupancy suggests that new construction takes roughly three to five years during the study period (Furman Center for Real Estate and Urban Policy, 2006). Adaptive reuse, reconfiguration or adding stories to existing buildings may be faster than new construction, depending on the level of alteration required, while large-scale development projects may take longer. I estimate neighborhood changes over four-to-five year periods; estimates using gallery density lagged by five years yield similar results but with weaker relationships, suggesting the five year lag is appropriate. Time lags shown in Appendix Table 4.

[19] Use changes are identified as changes across the seven broad categories previously defined. Size changes are defined above these thresholds: 10% of lot area, 20% of residential units, two or more stories. Results are not sensitive to modest changes in these thresholds.

[20] Given the small level of geography of this study, and the concentration of galleries in mostly commercial neighborhoods where building sales are rare, it is not feasible to get data on real estate prices or rents.

[21] http://nycopendata.socrata.com/Transportation/Subway-Stations/arq3-7z49.

[22] All but two parks have existed since the early 20th century. Hudson River Park was completed in 2003, the High Line's first section opened in 2009. Both parks were preceded by long periods of planning and construction, so any benefit to being near the parks was previously capitalized into land values and development patterns.

Table 5
Variable summary statistics.

Variable name	Mean	Std. Dev.	Min	Max	Obs
Gallery metrics					
New galleries	0.09	0.46	0.00	9.00	4237
Gallery density	0.43	0.04	0.24	0.50	4237
Star density	0.27	0.10	0.04	0.50	4237
Old star density	0.27	0.11	0.04	0.50	4237
Amenities					
Historic district	0.43	0.50	0.00	1.00	4237
Pre-40 bldgs	73.67	29.89	0.00	100.00	4237
Museum dist	0.58	0.24	0.09	1.32	4237
Park dist	0.53	0.35	0.00	1.76	4237
Subway dist	0.29	0.15	0.04	0.80	4237
Avg income	95.11	39.48	14.57	402.81	4237
High-income dist	0.71	0.34	0.01	1.84	4237
BA plus	54.36	21.25	0.00	85.81	4237
Rent	955.06	370.84	0.00	2001.00	4237
Land use & building characteristics					
Comm zoning	63.36	40.76	0.00	100.00	4237
Land use diversity	0.59	0.25	0.16	1.00	4237
Residential	42.49	34.86	0.00	100.00	4237
Retail	4.64	9.92	0.00	100.00	4237
Loft-industrial	8.66	17.82	0.00	100.00	4237
Hsg units	384.49	456.03	0.00	8756.00	4237
Lot size	1.24	22.44	0.02	839.99	4237
Stories	8.86	8.35	0.00	110.00	4237
Building change metrics					
Any change	11.72	15.72	0.00	100.00	4237
Residential change	2.11	8.29	−100.00	100.00	4237
Retail change	0.14	4.46	−100.00	100.00	4237
Story change	1.43	11.88	−137.00	191.00	4237

tracts. As an additional proxy for socioeconomic status, I identify the three highest-income tracts in both Downtown and Uptown regions per census year and calculate the distance from each block centroid to the centroid of the nearest designated high income tract.[23] This metric gives a more dispersed distribution than the weighted average income. Intuitively, a middle-income block surrounded by middle-income blocks may have different prospects for redevelopment – and different appeal to galleries – than a middle-income block near at least one very high-income block.

4. Empirical strategy

The identification strategy relies on two approaches. First, I assess what amenities and other neighborhood characteristics are correlated with gallery location choice, so that these can be directly controlled for. Second, I use an instrumental variables approach, predicting current star gallery density based on proximity to historic star galleries and high-income census tracts in 1970. The IV estimates help reduce bias from unobserved variables that may be correlated with current gallery density and the probability of redevelopment, such as the presence of other high-end commercial establishments.

4.1. Do galleries select high-amenity neighborhoods?

To analyze how galleries choose locations, I estimate the number of newly opened galleries as a function of prior star gallery density, physical amenities, population characteristics, land use patterns and building characteristics. The general form of the model is shown in Eq. (2) below:

$$NewGall_{it+1,t+3} = \alpha Star_{it} + \beta Amenity_{it} + \gamma Pop_{it} + \delta X_{it} + \theta NhoodYr_{jt} + \varepsilon_{it} \quad (2)$$

where i indexes the city block, j indexes the larger neighborhood (i.e. Soho) and t indexes the time period. *NewGall* is the number of newly opening galleries over several three-year periods (1992–1995, 1997–1999, and 2002–2004). *Star* is the initial star gallery density (1991, 1996, and 2001). *Amenity* is a vector of initial physical amenities: historic district status, building vintage, proximity to museums, parks and subway stations. *Pop* is a vector of population characteristics: weighted average household income, educational attainment, and average rent. X is a set of controls for initial land use and building characteristics. Variable sources and definitions are described in Table 4; summary statistics are shown in Table 5. The regression is estimated for all blocks and for Uptown and Downtown regions separately, to assess whether the dynamics of gallery location choice differ across regions. All regressions include fixed effects for neighborhood-year, to control for time-varying economic trends at a slightly larger scale. Standard errors are clustered by block.

Because the distribution of the dependent variable is highly skewed, and because the count variable includes only integers, the preferred specification is a Poisson model on the number of new galleries. Alternate specifications were tested, including an OLS model using log number of new galleries, Tobit model using log number of new galleries and correcting for left-censoring at zero, and a probit model with binary indicator for any new gallery. The sign and significance of most coefficients are robust across specifications, with the Poisson model yielding the most number of significant right-hand side variables (results available from author upon request).

4.2. Does proximity to art galleries predict redevelopment?

The primary research question is whether blocks near galleries undergo more building changes, controlling for initial amenities that may attract both galleries and other tenants or real estate investors. The general form of the regression is shown in Eq. (3):

$$Change_{it,t+5} = \alpha Star_{it} + \beta X_{it} + \gamma NhoodYr_{jt} + \varepsilon_{it} \quad (3)$$

where i indexes the city block, j the larger neighborhood, and t the time period. *Change* is a set of building/land use change metrics for three periods (1991–1996, 1996–2000, and 2000–2004). The primary dependent variable is the percent of parcels per block that undergo any transition; additional regressions examine changes in the residential and retail land shares and changes in total stories (quantity of building stock). *Star* is the initial star gallery density of the block (1990, 1995, and 1999). X is a vector of physical amenities, population characteristics, land use and building characteristics, as described above for the location choice model. All models include neighborhood-year fixed effects. Standard errors are clustered by block.

The main challenge to identifying whether galleries cause neighborhood redevelopment is the potential that galleries choose locations with unobservable attributes that independently affect the probability of redevelopment. For instance, in three of the most prominent gallery districts – Midtown, Soho and the Upper East Side – galleries are concentrated on prestigious commercial thoroughfares, interspersed with luxury shops, restaurants, beauty salons and similar establishments. If the presence of high-end commercial venues increases neighborhood property values, that will increase the likelihood of redevelopment, even in the absence of galleries. Assuming positive correlations between galleries and the presence of shops and restaurants, estimating redevelopment as a function of galleries while omitting measures of shops, etc., will introduce an upward bias in the estimated effect of galleries. Obtaining geographically and chronologically detailed data on shops, restaurants, and other economic activities that might co-locate with galleries is extremely difficult. To reduce the endogene-

[23] Robustness checks using 1–5 high-income tracts yield similar results, with three tracts providing the best fit in regression models.

ity problem, I use an instrumental variables approach, predicting current gallery locations from the locations of historic star galleries and proximity to historically high-income census tracts. Valid instruments for predicting current star density must be (1) correlated with the endogenous variable and (2) uncorrelated with neighborhood redevelopment, except through current star density. Below I discuss how each instrument meets these conditions.

4.3. Choice of instrumental variables

As shown in Figs. 1 and 2, Manhattan's gallery clusters are quite persistent over time. At least four neighborhoods – Midtown, East Midtown, the Upper East Side, and Greenwich Village – have had gallery concentrations since 1970 (and art histories of Manhattan indicate that some gallery clusters date back to the mid-1940s). Soho's gallery scene emerged in the early 1970s, and even after its reputed decline in the 1990s, the neighborhood still has over 100 galleries. Chelsea is the most recent cluster, but even Chelsea has had more than 10 galleries per year since 1970, placing it in the top third of Manhattan neighborhoods. The persistence of gallery clusters is noteworthy, given that the median gallery lifespan is only three years; clusters are maintained through a continuous turnover of establishments in similar locations. Star galleries play an important role in cluster persistence; as predicted by theories of agglomeration economies, lesser known new galleries benefit from locating near well-known existing galleries that attract art collectors to the neighborhood (Schuetz and Green, 2014). Moreover, star galleries have longer average life-spans than non-stars (9.5 years compared to 4.7 years), providing greater continuity to established clusters. As will be shown in Table 8, the proximity of each block to 1970 star galleries (the earliest year in the database) is strongly predictive of current star gallery density. In 1970, there were 26 star galleries in Uptown Manhattan (10 in Midtown, 16 on the Upper East Side), spread across 18 blocks. Downtown had no star galleries in 1970, but by 1974 there were 16 stars located on 11 blocks (one star in Gramercy, three in Greenwich Village and 12 in Soho). The instrumental variable is calculated as the distance from each block centroid to the nearest of these 42 early star galleries.

To meet the second condition for a valid instrument, proximity to historic star galleries must not directly impact changes to the surrounding building stock in 1990–2003. The persistence of gallery clusters raises several possible concerns. First, are historic star galleries still in existence, thus the instruments are directly impacting current buildings? The median lifespan of early stars 8.5 years; 35 of the 42 stars had closed their original location by 1990, but six original stars still operated in that location in 2003.[24] As a robustness check, these six original star blocks, and 13 additional blocks which had at least one star gallery continuously in operation until 1990 (but not the same gallery the entire time) will be dropped from the analysis. Second, did star galleries survive longer because they chose fortuitous locations, so that the neighborhood's growth contributed to both the stars' success and any observed redevelopment? To check this, I compare the lifespan of early non-star galleries located on blocks with at least one star gallery to early non-stars on blocks with zero star galleries. Non-star galleries on star blocks do not have significantly longer average lifespans than non-star galleries on non-star blocks (5.4 years compared to 4.9 years). Third, did historic star galleries attract other economic activity that continues into the study period? For instance, if shops and restaurants located near historic galleries, and those establishments continue into the study period, then the historic galleries will impact current building stock through other channels than current galleries. No data are available to test this hypothesis; if it is true, then the results using instrumented values of current galleries may be biased upwards. Thus my results are likely to be an upper bound estimate of galleries' true impact.

The second instrumental variable is the distance from each block to designated high-income census tracts in 1970. The intuition behind this instrument is that although Manhattan neighborhoods are economically quite dynamic, reputations lag actual changes in economic status.[25] If galleries seek out locations not just with current purchasing power, but with reputations as "old money" bastions, then proximity to historically affluent census tracts will be correlated with current gallery location choices. As shown in the results below, proximity to 1970 high-income tracts is indeed a strong predictor of current star gallery density. The second condition of a valid instrument, that proximity to 1970 centers of affluence does not directly impact redevelopment, is subject to the same limitations as historic star gallery location. Both affluent households and upscale commercial establishments may, like galleries, seek out "old money" neighborhoods, and thus affect current development patterns. Once again, this suggests the instrument will not completely eliminate the upward bias on current galleries.

5. Results

The analysis of new gallery locations suggests that galleries seek to cluster with prior star galleries, and that some physical and population amenities may attract galleries. However, results suggest that the presence of galleries has little impact on subsequent changes to the built environment, after controlling for initial amenities (both observed and unobserved).

5.1. What neighborhood characteristics predict gallery location choice?

Results provide support for the hypothesis that galleries consider proximity to other galleries, physical amenities and population characteristics in choosing their location (Table 6). The number of new galleries per block is strongly positively correlated with density of existing star galleries (Column 1), and the coefficient on star gallery density is robust in all specifications. Several types of physical amenities are predictive of new gallery locations: whether the block belongs to an historic district, the share of pre-1940 buildings, and proximity to major parks (Column 2). Consistent with the descriptive statistics in Table 2, the number of newly opening galleries is positively correlated with average block income and rent, but the coefficient on college-educated population share is negative (Column 2). Most of these results remain similar when combining star density, physical amenities and population variables, although the coefficient on historic district status becomes insignificant (Column 3). Including further controls for building stock and land use characteristics also has relatively little impact on the estimated coefficients on star density and amenities (Column 4). Adding these measures somewhat decreases the magnitude and significance of educational attainment and rent, while the coefficient on distance to subways increases and becomes significant. While amenities such as historic architecture, parks and wealthy residents appear to be complementary to galleries, access to public transit is not valued – not wholly surprising for establishments selling expensive goods. Only two of the building and land

[24] Several original star firms opened new establishments at other locations in later years.

[25] The highest-income tracts change in each of the census years examined (1970–2000). Only one 1970 high-income tract in Midtown remains in the top ranks through 2000. The top three Uptown tracts are always in Midtown or UES, but not the same tracts. Downtown's top tracts move across Lower Manhattan, Greenwich Village, Tribeca, and Stuyvesant Town/Peter Cooper Village, and move across tracts within those neighborhoods.

Table 6
What factors predict new gallery location?

Dependent var:	New galleries					
	(1)	(2)	(3)	(4)	(5)	(6)
Nhoods	All				Downtown	Uptown
Star density	20.28***		15.45***	14.53***	16.28***	12.46***
	(2.208)		(3.317)	(2.365)	(2.668)	(2.938)
Historic district		0.682***	0.130	0.345	0.476*	−0.017
		(0.262)	(0.244)	(0.241)	(0.252)	(0.365)
Pre-40 bldgs		0.018***	0.018***	0.0182***	0.013***	0.018**
		(0.003)	(0.004)	(0.005)	(0.005)	(0.009)
Museum dist		−0.706	−0.516	−1.089	−2.676*	0.166
		(0.723)	(0.752)	(0.744)	(1.398)	(0.727)
Park dist		−4.877***	−2.649**	−2.500**	−2.225	−2.479**
		(0.965)	(1.063)	(1.118)	(1.465)	(1.147)
Subway dist		1.291	1.395	2.057**	4.108**	1.730
		(1.140)	(1.150)	(1.046)	(1.894)	(1.106)
Avg income		0.013***	0.005**	0.00359**	0.011	0.004*
		(0.002)	(0.002)	(0.002)	(0.009)	(0.002)
BA plus		−0.039***	−0.030***	−0.0157*	−0.010	−0.0171*
		(0.011)	(0.010)	(0.009)	(0.013)	(0.010)
ln (rent)		2.161***	1.858***	0.731*	−0.204	1.364***
		(0.601)	(0.444)	(0.416)	(0.847)	(0.433)
ln (housing units)				−0.006	−0.034	0.207*
				(0.099)	(0.120)	(0.108)
Comm zoning				0.0120***	0.012***	0.007
				(0.003)	(0.004)	(0.005)
Land use diversity				−1.319	−1.578	−0.022
				(0.821)	(1.024)	(0.837)
Lot size				−0.467	−0.359	−7.444***
				(0.552)	(0.641)	(2.490)
Stories				0.011	0.041	0.058
				(0.024)	(0.025)	(0.051)
Residential				−0.002	−0.004	−0.013
				(0.009)	(0.011)	(0.011)
Retail				0.001	0.000	0.022
				(0.009)	(0.012)	(0.015)
Loft-industrial				0.0156***	0.014***	0.029**
				(0.005)	(0.005)	(0.013)
Fixed effects	Nhood-yr	Nhood-yr	Nhood-yr	Nhood-yr	Nhood-yr	Nhood-yr
Observations	4237	4237	4237	4237	2159	2078

Coefficients estimated for Poisson models on number of new galleries per block. Robust standard errors, clustered by block, in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

use variables are statistically significant: land zoned for commercial activity and loft-industrial land share are positively associated with new galleries.

The final two columns of Table 6 estimate the same specification separately for Uptown and Downtown blocks; if galleries in these two regions are qualitatively different, for instance by type of art sold or target clientele, then they may exhibit different preferences over locations. Some factors are consistent predictors of new galleries in both regions: existing star density, share of older buildings, and loft-industrial land shares are positively correlated with new galleries in both regions (Columns 5–6). In general, new Downtown galleries are somewhat more sensitive to physical characteristics, while Uptown galleries appear more responsive to population characteristics. Downtown, new galleries are positively associated with commercial zoning and (at the 10% significance level) with historic district status and proximity to museums, but negatively associated with proximity to subway stations (Column 5). On Uptown blocks, new galleries are more likely to open close to parks, on high-rent blocks with smaller average lots. New galleries are weakly associated with household income and educational attainment.

5.2. Does gallery density predict neighborhood physical change?

As context for the types of neighborhood change that occur in Manhattan, Table 7 provides summary statistics of land use and building metrics over time, for gallery and non-gallery blocks. For both types of blocks, residential land is the single largest use, and residential land share increases by several percentage points over time. Gallery blocks increase from about 47% residential in 1991 to just under 54% residential in 2004. On non-gallery blocks, residential land share grows from about 39% in 1991 to 45% in 2004. Average retail land shares are quite small, around four to 5%, and the pattern of change in retail land over time is less clear. Gallery blocks see a slight increase in retail land from 1991 to 1996, then a slight decline. On non-gallery blocks, retail land increases from 4.15% in 1990 to 4.87% in 2000, before declining slightly in 2004. Gallery blocks have more aggregate building stock than non-gallery blocks; the average total stories per gallery block is around 150, around 100 on non-gallery blocks. But on gallery blocks there is not an obvious pattern among changes in total stories over time. By contrast, non-gallery blocks gain about eight total stories from 1991 to 2004. Thus from the raw data, it is unclear whether the presence of galleries is consistently associated with changes in land use or quantity of building stock.

To formally test the relationship between galleries and building changes, I estimate a series of regressions, beginning with a simple bivariate OLS model, then adding controls for initial block characteristics and neighborhood fixed effects, then moving to the IV approach (Table 8). The main dependent variable is the percent of parcels per block that undergo any type of transition over each four-five year period, and the key independent variable is the

Table 7
How does Manhattan building stock change over time?

	Gallery	No gallery	Difference
1991			
Residential	46.77	38.63	8.14***
Retail	4.68	4.15	0.53
Stories	151.36	96.19	55.16***
n=	539	878	
1996			
Residential	47.36	39.29	8.06***
Retail	5.22	4.28	0.94*
Stories	157.47	96.78	60.69***
n=	525	889	
2000			
Residential	47.50	41.28	6.23***
Retail	5.06	4.87	0.19
Stories	153.79	102.37	51.42***
n=	492	920	
2004			
Residential	53.62	45.10	8.52***
Retail	5.12	4.41	0.71
Stories	155.43	104.02	51.41***
n=	492	924	

Block-level averages of residential and retail land shares, total number of built stories per block. Last column shows two-tail t-tests for difference in means across groups.
** $p < 0.05$.
* $p < 0.1$.
*** $p < 0.01$.

Table 8
Star gallery density and building changes.

Estimation:	(1) OLS	(2) OLS	(3) IV	(4) IV
Dep var: any change				
Star density	2.055***	1.048**	0.508	0.42
SE	(0.231)	(0.411)	(0.896)	(0.938)
R-sq	0.023	0.285		
Results on 1st-stage regressions				
Star density, 1970			0.273	0.259
t-stat			(12.39)	(11.75)
Distance, 1970 high-income tract			−0.107	−0.107
t-stat			(14.24)	(14.25)
First stage robust F			252.256	242.110
Partial *R*-sq of excluded instruments			0.220	0.212
Nhood-yr fixed effects	N	Y	Y	Y
Other controls	N	Y	Y	Y
Observations	4232	4232	4234	4175

Each cell shows results from one regression: coefficient on star gallery density; robust standard errors, clustered by block; and *R*-squared. Other controls include % historic district, % structures pre-1940, distance to museums, parks, subways, distance to high-income census tracts, % commercial zoning, Herfindahl index of land use, land shares of residential, commercial and loft-industrial, average lot size and building height. Models 1–2 are OLS specifications, Models 3–4 are IV estimates, predicting current star density using proximity to 1970 star galleries and high-income census tracts. Model 4 excludes 19 blocks with continuous star gallery presence, 1970–1990.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

density of star galleries at the beginning of the period. In the simple bivariate OLS model, star density is strongly positively associated with rates of building change (Column 1). Adding controls for initial block-level physical and population characteristics, as well as neighborhood-year fixed effects, decreases the magnitude of the star density coefficient by about half and nearly doubles the standard errors, although the estimated effect is still statistically significant (Column 2). This suggests that at least some of the propensity for blocks near galleries to undergo change stems from physical or economic variables that are correlated with gallery location choice, but does not rule out the possibility that star galleries themselves have an independent effect.

To correct for correlation between star density and unobservable factors that may impact neighborhood change, current star density is predicted using a two-stage least-squares model, with 1970 star density and distance to 1970 high-income census tracts as instruments (Column 3). The estimated coefficient on star density drops by about half, relative to the OLS model with full controls, and is no longer statistically significant. Results on the first-stage regressions indicate that both instruments are strong predictors of current star density. First-stage t-statistics of historic star density and high-income tract distance are 12.4 and 14.2, respectively; the first-stage robust F statistic of 252 is well above the threshold for weak instruments. Additionally, Hansen's J chi-squared test for overidentification fails to reject the null hypothesis that the instruments are uncorrelated with the error term in the second-stage equation (*p*-value is about 0.19).[26] As discussed in Section 4, however, it is possible that historic star gallery locations and historically high-income neighborhoods may continue to attract amenities, due to lags in neighborhood reputation, so even the IV estimates are likely to be an upper bound on the true impact of current star galleries. As an additional robustness check, the last column drops observations for approximately 20 blocks that have been home to at least one star gallery continuously from 1970 to the study period; these blocks are most likely to suffer from upwards bias due to unobserved amenities. As expected, the estimated coefficient on star density declines slightly without these blocks and is again not significant. In all models, the estimated relationship between star density and rate of building change is positive; no regressions produce coefficients precisely estimated at zero.

The dependent variable used in these regressions, rates of building change, is essentially agnostic about what types of changes are linked to galleries. Table 9 presents results on whether star galleries are associated with specific land use changes suggested by case studies – namely, growth in residential and retail activity – as well as changes in the total building quantity (number of stories). Results from bivariate OLS regressions are consistent with hypotheses suggested by case studies: star gallery density is positively correlated with changes in residential and retail land shares, and with change in aggregate number of stories per block (Column 1). But none of these results are robust to inclusion of controls for initial block-level physical and economic conditions, or neighborhood-year fixed effects (Column 2). With the full set of controls, star density becomes negatively associated with changes in residential land share, significant at the 1% level. The raw data shown in Table 7 indicates that most blocks gained residential land share during the study period, so the interpretation is that blocks near star galleries had smaller gains in residential land, controlling for initial characteristics. The estimated coefficient on star density in the retail land share regression drops by about half and becomes statistically insignificant. And star density becomes negatively associated with change in aggregate stories, although not statistically significant.

Instrumenting for current star density provides qualitatively similar results (Column 3). In the residential land share model, the coefficient on star density is a larger negative number, although the larger standard errors decrease the significance level

[26] As a further check on the instruments' strength, I also estimate the regression using several placebo instruments, variables that are hypothesized to be uncorrelated with star gallery locations. Estimates predicting star density as a function of distance from churches, K-12 schools, and post offices all fail the first-stage tests. This provides greater confidence that historic stars and high-income tracts are not just spuriously correlated with current star density. Results of placebo instrument tests are shown in Appendix Table 2.

Table 9
Star gallery density and changes in land use, total building stock.

Estimation:	(1) OLS	(2) OLS	(3) IV	(4) IV
Residential change				
Star density	4.476***	−9.056***	−9.963*	−10.48*
	(1.046)	(2.326)	(5.533)	(5.839)
R-sq	0.003	0.178		
Retail change				
Star density	2.094***	0.953	−0.445	−1.319
	(0.578)	(1.280)	(2.662)	(2.762)
R-sq	0.002	0.083		
Story change				
Star density	3.535**	−1.85	−1.692	−3.264
	(1.464)	(3.993)	(8.180)	(8.578)
R-sq	0.001	0.051		
Nhood-yr fixed effects	N	Y	Y	Y
Other controls	N	Y	Y	Y
Observations	4232	4232	4234	4175

Each cell shows results from one regression: coefficient on star gallery density; robust standard errors, clustered by block; and *R*-squared. Other controls include % historic district, % structures pre-1940, distance to museums, parks, subways, distance to high-income census tracts, % commercial zoning, Herfendahl index of land use, land shares of residential, commercial and loft-industrial, average lot size and building height. Models 1–2 are OLS specifications, Models 3–4 are IV estimates, predicting current star density using proximity to 1970 star galleries and high-income census tracts. Model 4 excludes 19 blocks with continuous star gallery presence, 1970–1990.

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

to 10%. The estimated coefficient on star density flips from positive to negative in the retail land model, but again is not statistically significant. And the estimated relationship between star density and change in aggregate stories is still negative and insignificant. As with the results in Table 8, IV estimates omitting blocks with continuous star galleries decreases the magnitude of all estimated coefficients on star density (column 4). Together these results suggest that, although blocks near star galleries do gain more residential and retail land, and more total building stock, these changes are due to initial physical and economic conditions, and possibly unobserved amenities that are also correlated with gallery location.

The final analysis tests whether star galleries have different relationships with neighborhood change in the two regions of Manhattan's art market (Table 10). Case studies have posited that galleries contributed to gentrification in Soho and Chelsea, but have not made such claims about the more established neighborhoods of Midtown and the Upper East Side. Bivariate OLS regressions do provide more evidence of an association between star galleries and neighborhood change on Downtown blocks. Among Downtown neighborhoods, star density is positively associated with overall rate of building transition, change in residential and retail land shares, and change in total stories (Column 1). For Uptown neighborhoods, the bivariate OLS models also show positive associations with all four outcomes, but only rate of building change and change in stories are statistically significant (Column 4). As with the pooled sample, the only one of these results that remains positive and significant, when adding covariates and fixed effects, is the association with overall rate of building transition (Row a, Columns 2 and 5). For Downtown blocks, the coefficient drops by about half with controls, while for Uptown blocks, the magnitude rises somewhat. Both of these estimates decrease in magnitude and become insignificant under the IV estimates (Row a, Columns 3 and 6). Adding controls to the regressions on change in residential land share flips the estimate on star density from positive to significantly negative (Row b, Columns 2 and 5). These estimates become larger negative values but insignificant in the IV models (Row b, Columns 3 and 6). Estimated coefficients on change in retail land share are consistently positive for Downtown blocks, although progressively smaller and with larger standard errors when adding full controls and using IV (Row c, Columns 1–3). Uptown blocks never show a significant relationship between gallery density and retail land share, and the estimates with full OLS

Table 10
Star gallery density and neighborhood changes, by region.

Estimation:	Downtown			Uptown		
	(1) OLS	(2) OLS	(3) IV	(4) OLS	(5) OLS	(6) IV
(a) Any change						
Star density	2.937***	1.470**	1.141	1.084***	1.402**	0.493
	(0.350)	(0.622)	(1.718)	(0.309)	(0.595)	(1.093)
R-sq	0.043	0.343		0.007	0.235	
(b) Residential change						
Star density	6.523***	−9.129***	−10.68	1.043	−6.586**	−10.44
	(1.607)	(3.413)	(10.600)	(1.252)	(3.159)	(6.618)
R-sq	0.006	0.17		0.00	0.19	
(c) Retail change						
Star density	3.182***	1.226	0.97	0.389	−1.423	−2.987
	(0.887)	(2.163)	(13.660)	(0.664)	(1.989)	(4.044)
R-sq	0.001	0.125		0.001	0.165	
(d) Story change						
Star density	4.153**	3.209	7.336	5.063**	1.472	0.64
	(1.856)	(6.689)	(16.140)	(2.535)	(4.417)	(10.230)
R-sq	0.001	0.057		0.002	0.058	
Nhood-yr fixed effects	N	Y	Y	N	Y	Y
Other controls	N	Y	Y	N	Y	Y
Observations	2158	2155	2155	2078	2077	2077

Each cell shows results from one regression: coefficient on star gallery density; robust standard errors, clustered by block; and *R*-squared. Other controls include % historic district, % structures pre-1940, distance to museums, parks, subways, distance to high-income census tracts, % commercial zoning, Herfendahl index of land use, land shares of residential, commercial and loft-industrial, average lot size and building height. Models 1–2 and 4–5 are OLS estimates. Models 3 and 6 predict current star density using proximity to 1970 star galleries and high-income census tracts.

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

controls and IV are negative (Row c, Columns 4–6). Estimates on change in aggregate stories are positive in all specifications for both regions, but only significant in the bivariate regressions (Row d, Columns 1 and 3). Moving from OLS with controls to IV decreases the estimated magnitude of the star density coefficient in seven of the eight regressions, as would be expected if the instruments reduce an upward bias from omitted amenities. The only case where the IV estimate is larger than the OLS with controls is change in stories for Downtown blocks (Row d, Column 3).

Overall, the region-specific results are quite consistent with the pooled specifications in Table 9, and do not provide robust evidence that proximity to star galleries is correlated with neighborhood redevelopment, whether measured as overall rates of building change, gains in residential or retail land shares, or increased quantity of building stock.

6. Conclusion

Soho's story of transition from blighted industrial wasteland to artists' colony to upscale shopper's paradise has sparked interest among researchers and policymakers in the relationship between the arts and economic development. An increasing number of U.S. cities offer place-based incentives for cultural events or activities, such as designating Arts Districts in formerly industrial neighborhoods or establishing periodic "Art Walks", in the hopes of spurring broader economic activity. Yet prior research has not definitively determined whether Soho's transformation is the consequence of its concentration of artists and galleries, or whether artistic activity was drawn to the neighborhood because of intrinsic qualities that also attracted mainstream commercial activity. In this paper, I examine whether gallery location choices reflect preferences over neighborhood amenities, and whether gallery presence leads to subsequent changes in building stock and land use patterns.

Results suggest that new galleries choose to locate in neighborhoods with higher levels of exogenous amenities. More new galleries open on blocks with pre-1940 housing, close to museums and parks, with commercial-friendly zoning and higher household income. Proximity to prior "star" galleries is strongly predictive of new gallery openings. Results provide little evidence that proximity to star galleries is correlated with several metrics of neighborhood redevelopment. The simplest models, bivariate OLS specifications, show a positive correlation between star gallery density and the overall rate of building transition, gains in residential and retail land shares, and aggregate building quantity. However, these correlations are not robust to adding controls for initial physical amenities, population characteristics and neighborhood-year fixed effects. The estimated magnitude and significance drop still further in IV estimates, when current gallery density is predicting using lagged gallery locations and proximity to historically high-income census tracts. These results are consistent with the hypothesis that star galleries choose desirable locations that subsequently undergo more transition, but redevelopment reflects both observed and unobserved amenities in these locations.

This research focuses solely on Manhattan, which is atypical of U.S. cities both in the size and concentration of art galleries and in the density of its built environment. No quantitative research has studied the structure of art markets in other cities, so it is difficult to predict the external validity of the findings. Peterson's (1997) qualitative study reveals many similarities with the Parisian art market: clustering of galleries in a few districts; some specialization in type of art by district; relatively short tenure for most galleries, with a few long-standing venerable dealers. It seems plausible that the findings from Manhattan could be applicable to the handful of other developed-country cities that have important roles in the international art market, such as Los Angeles, Paris, London, and Milan.[27] Relevance of the findings to smaller cities in the U.S is less clear. On the one hand, Manhattan seems to offer optimal conditions for gallery-led growth, given the volume and density of both star and non-star galleries. On the other hand, the age and density of Manhattan's existing building stock, and the cumbersome nature of the development process, may limit the potential for redevelopment. Perhaps in cities with lower barriers to new development, galleries and other artistic venues might have more discernible impacts on the surrounding neighborhoods. Moreover, this research only examines the impact of art galleries, and does not address the question of whether artists' residences, studios or performing arts venues might regenerate blighted neighborhoods. An implication for policymakers is that Arts Districts or other place-based policies aimed at arts-led economic development should consider what types of cultural activities should be targeted. Comparing the impacts of galleries across multiple cities, or comparing impacts of different types of cultural activities within the same city, are both areas that could benefit from future research.

Some of the findings in this paper may be applicable to other industries or markets. One possible analogy could be restaurants. Outside of fast food, the restaurant industry is also largely composed of small establishments run by independent entrepreneurs; a few "star" chefs have widespread name recognition and so can attract customers to any location, while lesser-known restaurants must advertise or select locations with high volumes of foot traffic. Consumer preferences in food, as in art, are personal and idiosyncratic. Future research could investigate whether high-end restaurants or boutique stores exhibit similar location patterns to art galleries, and what impacts (if any) they have on local economic development.

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Appendix A. Supplementary material

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jue.2014.08.002.

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