Does Zoning Help or Hinder Transit-Oriented (Re)Development?

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Abstract

Despite its reputation as a car-oriented city, the Los Angeles metropolitan area has made substantial investments in developing rail transit since 1990. Most new stations were added to an already dense built environment, with auto oriented zoning and established land use patterns. In this paper we ask whether redevelopment is occurring around Los Angeles rail stations, and whether zoning and related policies are facilitating or constraining transit-oriented development. We conduct case studies of five stations, documenting zoning near stations, as well as the amount and type of new development after stations opened. Results illustrate that incompatible zoning and related land use policies may constrain growth near stations, but TOD-friendly zoning alone is not sufficient to spur development.

Keywords
Public transportation, zoning, housing markets, land use planning, urban spatial structure, local government

JEL codes: H7, O18, R1, R3, R4, R5

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Introduction

It is difficult to imagine New York City without the subway, London without the Tube or Paris without the Métro. In cities that built intra-city passenger rail systems more than 100 years ago, the current built environments have grown up around transit infrastructure. Successive waves of growth have added height and density near stations, creating clusters of jobs and housing. Patterns of high-density mixed use development are still emerging around rail systems built in the 1960s and 1970s, in cities such as Washington DC, the San Francisco Bay Area, Mexico City and Seoul. As cities around the world grapple with increasing traffic congestion, local governments are developing new rail systems and expanding existing ones, from Beijing to Brasilia, Manhattan to Chennai. These large ongoing public investments raise a number of questions. When rail infrastructure is added to an already dense built environment, will new development patterns emerge? What form might redevelopment near stations take, and when will it become apparent? Does zoning facilitate or impede transit-oriented development around new stations?

In this paper, we investigate these questions by documenting zoning and new development around five Metro rail stations that opened in central Los Angeles between 1993 and 2003. Despite its reputation as a car-oriented city, the Los Angeles metropolitan area has for decades been investing substantially in rail transit. In the 1960s, when the city was losing population and jobs to rapid suburbanization, regional leaders believed that a subway along the Wilshire Corridor would revitalize the central city. A new transit authority was established in 1964. After three unsuccessful attempts, in 1980 a proposal for a countywide rail network was passed, along with a one-half cent sales tax to fund development (Fulton, 1996). Additional
sales tax measures were passed in 1990 and 2008. Together these taxes generate approximately $2.3 billion annually, of which about half is available for rail capital construction.\(^1\) To date, LA Metro has invested $9 billion (in nominal terms) in rail infrastructure, building more than 75 stations along six rail lines, and has by far the largest transit construction program in the U.S. (Nelson and Weikel, 2016). City and county governments (and many voters) see rail transit as the key to reducing congestion, restructuring urban form, creating a livable city, and attracting economic development.

However, several factors may hinder both ridership and the potential for economic growth near stations. Although the Los Angeles–Orange County MSA has a dense residential population, employment is distinctly polycentric and dispersed throughout the MSA, with a relatively weak CBD (Giuliano et al, 2015). Development patterns are highway oriented; the largest employment clusters are located along major freeway corridors. In most instances, the LA Metro rail stations were built in already dense neighborhoods with auto oriented zoning and established land use patterns. The station locations were selected more for political expediency than economic efficiency, which may diminish the potential for both ridership and nearby development (Elkind, 2014; Taylor et al 2009). Despite the region’s long-standing and substantial investment in rail infrastructure, LA Metro currently has fewer daily boardings than 30 years ago, when the system was only buses (Nelson and Weikel, 2016). Anecdotal observation suggests that relatively few stations have experienced physical and economic growth after station opening.

\(^1\) Source: [https://www.metro.net/about/financebudget/taxes/](https://www.metro.net/about/financebudget/taxes/); rail construction funds estimated by the authors.
Standard urban economic models predict that building new rail stations should increase the accessibility of surrounding neighborhoods, leading to higher land values and attracting higher density development (Alonso, 1964; Mills, 1967; Muth, 1969). But redevelopment in dense urban areas is generally more costly than “greenfields” development, requiring demolition of existing structures, possible environmental remediation, and land assembly from multiple owners (Wheaton, 1978). Thus redevelopment near new stations will only occur if land values around the station have increased enough to support substantially higher density development than the existing structures.

Additionally, zoning may constrain higher-density redevelopment near stations through a variety of mechanisms, including bans on TOD-compatible land uses, density limitations, or procedural rules that add to “soft” development costs (Glaeser et al 2006). Of particular concern in California is the statewide California Environmental Quality Act (CEQA), which requires public review and comment as part of an environmental impact review for nearly all development projects (Olshansky, 1996). Neighbors and public leaders may use CEQA and other zoning rules to impede unwanted redevelopment. Conversely, public officials and nearby residents can facilitate change near stations by increasing the allowable density, granting density bonuses, fast-tracking proposed development, or soliciting development through public-private partnerships (Cervero 2004). In short, whether redevelopment occurs near new stations depends on the interaction between property values, pre-existing land uses, and zoning.

Previous empirical studies have examined the outcomes from newly built transit systems across a variety of US cities. Quantitative research has found widely mixed results of transit investment on transit ridership, land values, housing prices, population and housing density, and employment composition (Baum-Snow and Kahn 2005; Boarnet and Crane 1997; Chatman et al
A few studies have incorporated measures of the built environment as explanatory variables (Bowes and Ihlanfeldt, 2001; Duncan, 2011; Schuetz, 2015).

Several qualitative studies have described zoning, planning and fiscal tools that can be used to encourage development near stations (Belzer and Autler 2002, Cervero 2004, Ellis 2005, Greenberg 2004). These include density bonuses, minimum density regulations, flexible parking regulations, prohibition of certain land uses, and tax incentives. TOD overlay districts and form-based zoning are popular ways to implement these tools around stations (Cervero 2004, Ellis 2005). Most of these studies take a “best practices” empirical approach to evaluating the effectiveness of zoning, describing particular rules or policies used at selected successful TOD locations across the U.S. Additionally, Cervero (2004) surveys transit authority officials on the perceived effectiveness of several zoning and fiscal policy tools. Our approach differs from these prior studies in two important ways. First, we include unsuccessful as well as successful TOD sites, to illustrate the contrasts across sites in zoning, land use and local real estate markets. Second, our cases are drawn from multiple neighborhoods within a single city, which better allows us to isolate the role of zoning from citywide economic conditions and other potentially confounding factors. Like other qualitative zoning TOD papers, we employ case studies to provide richer descriptions of the idiosyncratic conditions near stations. Most quantitative studies estimate fairly parsimonious models that do not control for zoning or institutional factors (Baum-Snow and Kahn, 2005; Bowes and Ihlanfeldt 2001; Schuetz et al 2016).

The remainder of the paper discusses our empirical approach and presents findings from the five cases. We document existing land use patterns, zoning, and changes in land use and the built environment since the stations opened. Two station areas – Hollywood/Vine and Pershing 2012; Giuliano and Agarwal 2010; Hess and Almeida 2007; Kolko 2011; Schuetz et al 2015).
Square – have seen growth in housing and commercial uses. These areas have TOD-compatible zoning, strong real estate markets, and benefitted from targeted local government efforts to encourage development. The other three stations – Vermont/Santa Monica, Highland Park and Civic Center – have seen few changes in land use or buildings. Two areas have incompatible or ambiguous zoning, and two areas have had relatively soft real estate markets. These results suggest that zoning may constrain redevelopment, but that TOD-compatible zoning alone will not induce development. Although the analysis focuses on Los Angeles, the findings are relevant for other auto-oriented cities in the U.S., Canada and Australia that are trying to alter travel behavior and land use patterns through rail transit investments.

Data sources and empirical approach

Our research design examines cross-sectional variation and changes over time in zoning, land use, and physical environment, to better understand the extent of TOD around five LA Metro rail stations that opened between 1993 and 2003.

Selection of study neighborhoods and stations

To ensure sufficient variation in outcomes, we identified two station areas that have had substantial post-station development or land use change as well as three stations with little or no change. The stations are located in three neighborhoods that are broadly representative of Los Angeles station areas (Figure 1).² Pershing Square and Civic Center stations are located in Downtown Los Angeles, which is the region’s largest employment center but historically had little residential population. Hollywood/Vine and Vermont/Santa Monica both lie within the

² We restricted the study to three Metro rail lines – Gold, Purple and Red – largely for timing and data availability.
Hollywood neighborhood in Central Los Angeles, a relatively high density mixed-use corridor, with commercial uses concentrated along major streets and medium-to-high density residential uses along side streets. The third neighborhood, Highland Park, is a lower-density, mostly residential area in Northeast Los Angeles.

We document pre-existing land use patterns, baseline zoning, and supplemental neighborhood plans, as well as other targeted government efforts to promote development near stations. We assess the compatibility of each station’s zoning with the principles of TOD: namely, the feasibility of developing medium-to-high density residential and commercial structures. Case studies are presented in descending order of TOD-compatibility and extent of local government promotion of development. We also provide context on broader neighborhood demographic and economic factors that may influence nearby development. While our results suggest that zoning and prior land uses are associated with the likelihood of TOD, they do not establish a causal relationship, because there may be unobservable neighborhood characteristics correlated with both redevelopment and zoning.

Data sources

Information on zoning and land use plans was obtained from the Los Angeles Department of City Planning website. The city’s online Zone Information and Map Access System (ZIMAS) was used to determine the current zoning classification for all parcels within one-quarter mile of the station.\(^3\) We follow the literature in defining TOD-compatible zoning as a regime that allows both residential and commercial uses (such as retail, household services, retail, household services,

\(^3\) One-quarter mile radius is the typical passenger catchment area for rail stations (Kolko 2011). For our station areas, assessment of TOD-compatibility and redevelopment outcomes would be very similar if we limited the area to blockfaces adjacent to the station.
hotels and offices) at medium-to-high densities, as set by floor-to-area ratio (FAR) or dwelling units per acre (Belzer and Autler 2004). We also assess zoning complexity, based on the number of different land use plans that regulate development in each neighborhood. Land use plans and adoption dates were obtained from the Los Angeles City Planning website.

To track redevelopment and land use changes near stations, we document the existing structure type, land use, year structures were built, and number of residential units (if relevant). Property-level data on housing sales volume, sales prices, and new housing construction from 1988 to 2012 were obtained from DataQuick. Transactions data have weak coverage of multifamily rental buildings and conversions from non-residential buildings, therefore we also rely on parcel-level data from the Los Angeles County Tax Assessor’s website and the online building permits database of the Los Angeles Department of Building and Safety.

The location and opening dates of rail transit stations were assembled from the LA Metro website and supplemental documentation. Station addresses were geocoded and matched to census geographies. Population characteristics were assembled from tract-level data from the 2005-2009 American Community Survey. Because stations often abut multiple census tracts, we calculate weighted average characteristics for each station, based on the land share in each adjacent tract. Demographics around stations are therefore approximate.

**Station case study findings**

For each station, we present information on current zoning and land use within the station’s immediate vicinity, and whether these elements have changed since the station opened. We document any redevelopment that has occurred near stations after opening. We also provide some general context for each neighborhood’s current physical and economic environment.
Located in north-central Los Angeles, the Hollywood neighborhood is a densely developed urban area that includes tourist-oriented retail and entertainment, several residential neighborhoods, and office and industrial zones. The Hollywood/Vine Metro station sits at the intersection of two major commercial thoroughfares; the famous Hollywood Walk of Fame borders the station entrance on Hollywood Boulevard (Figure 2). Many of the surrounding hotels, apartment buildings and theaters date from the 1910s through 1930s and are architecturally notable. The demographically and economically diverse population mirrors the city’s overall composition (Table 1).

Zoning near the station allows a high-density mixture of residential and commercial uses (Table 1). Some of the older buildings exceed currently allowable densities, meaning that if they were demolished replacement buildings would be smaller than current structures. Development in the area is regulated by the Hollywood Community Plan, which was adopted in 1988, during the Metro planning process but before construction of the Red Line had been completed. The Plan calls for the preparation of new station area master plans “if higher intensity development is to be encouraged” near stations. A new Hollywood Community Plan Update was adopted in 2012, which would have increased allowable density and encouraged additional development along commercial corridors such as Hollywood Boulevard (Zahniser, 2013). However, the new plan was highly controversial among residents, who challenged it in court. It was rescinded in 2014 after a judge ruled that the Environmental Impact Report contained errors. Until 2012, the
station area also fell under the statewide Community Redevelopment Agency (CRA) boundaries, which granted additional tax revenues for development (Blount et al, 2014).4

Targeted and sustained efforts by the city government have led to the development of a mixed-use TOD project above the Hollywood/Vine station. Through a 2001 Joint Development Agreement between the MTA and private developers, the MTA used eminent domain to acquire several small lots, demolished the existing structures (mostly small retailers) and merged the lots into a single large parcel (City of Los Angeles 2006). The redeveloped site, completed in 2009, consists of a W hotel, condominiums, rental apartments (of which about 20 percent are required to be affordable to low- and moderate income households), and approximately 60,000 square feet of ground floor commercial use (Figure 3).5 Monthly rents for the market-rate apartments in the building -- ranging from $2000 for a studio to over $7000 for a two-bedroom -- are likely out of reach for many of the neighborhood’s existing residents, given the median household income of $31,000.6 The redeveloped site represents both a shift in land uses and an increase in housing and commercial square footage.

The broader real estate market around Hollywood/Vine has also strengthened since the Great Recession. Residential sales near the station have increased substantially since about 2006, with roughly 40 sales per year and a median price of $660,000 per unit. Numerous restaurants and stores have also opened near the station within the past ten years.

*Pershing Square Station: New Adaptive Reuse Ordinance encouraged housing*

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4 In February 2012, the State of California disbanded the Community Redevelopment Agencies.  
5 The number of rental units and hotel rooms are taken from City of Los Angeles (2006).  
The Pershing Square station is located in the Historic Core sub-neighborhood of Downtown Los Angeles, an economically and demographically diverse area that has undergone substantial population change in the past 10 years. The station’s name derives from the adjacent public plaza, which houses various activities, from a weekly farmers’ market to free meals for Downtown LA’s sizeable homeless population (Figure 3). The station is surrounded by high-rise office buildings with ground-floor retail and restaurants, high-rise residential buildings, and surface parking lots. Most buildings date from the 1910s and 1920s and have distinctive architectural features.

Nearly all the parcels near the Pershing Square station are zoned for high-density commercial and residential activity (Table 1). However, many of the existing early 20th century structures exceed the current allowable densities, some by as much as 30 percent. The Historic Core neighborhood has seen substantial change since the city’s adoption of the Adaptive Reuse Ordinance (ARO) in 1999. The ordinance encouraged conversion of commercial buildings – many of which had been vacant for decades -- into housing through an expedited approval process and waivers of certain zoning and building code provisions.7

No new structures have been built within several blocks of the Pershing Square Station, but at least six nearby high-rise buildings underwent residential conversions since 2005, including two conversions on adjacent or facing blocks.8 These buildings contain roughly 500 housing units (both condominiums and rental apartments). No residential sales occurred near Pershing Square station from 1988 through 2004, rising to about 50 sales per year from 2005 to

7 http://preservation.lacity.org/incentives/adaptive-reuse-ordinance
8 Conversion dates were verified through the online building permits database. Tax parcels do not correspond exactly to building structures, so the number of residential units in converted buildings is an estimate.
2008, and more than 100 sales per year from 2009 to 2012. Median condo prices range from $250,000 to $500,000.

As a result of the increased housing stock in the neighborhood – which represents a substantial upgrade from the few previous below-market apartments – the residential population has grown substantially since 2000. More affluent households have moving into the newly converted apartments and condominiums. Nearby retail is also shifting from stores and services oriented to working-class Latinos, towards trendy, upscale stores and restaurants (Immediato 2015, Wotapka 2013).

**Vermont/Santa Monica Station: Compatible zoning, weak demand**

The Vermont/Santa Monica Station is also located within the Hollywood neighborhood, about 2.5 miles southeast of Hollywood/Vine, at the intersection of two active commercial streets (Figure 4). Land uses near the station are predominantly low-rise, low-density commercial buildings, including a shopping center with parking lot, fast food restaurants, and a gas station. Most structures date from the 1950s through 1970s. The station is one block north of Los Angeles City College, a public community college, which is the area’s largest employer. While both Vermont Avenue and Santa Monica Boulevard are primarily commercial, the side streets are mostly residential, with a mixture of modest one- and two-story single-family houses and small apartment buildings dating from the 1920s through 1950s. The median household income and population density are similar to that of the Hollywood/Vine station area, and nearly two-thirds of the area’s population was Hispanic (Table 1).

Zoning near Vermont/Santa Monica reflects the area’s mixture of commercial and residential uses: parcels along the two main streets are zoned medium-density commercial while the side streets are zoned for medium-density multifamily residential (Table 1). Land use is
governed by the Hollywood Community Plan and the Vermont/Western TOD Specific Plan, adopted in 2001 to encourage additional development near the station. The TOD Specific Plan allows somewhat higher allowable commercial densities along the main intersection, while preserving existing densities along the residential side streets. The Specific Plan enumerates various other goals: encouraging pedestrian-oriented streetscape improvements, ensuring “a well-planned combination of commercial and residential uses with adequate open space”, as well as the “creation of a lively civic atmosphere” and less specifically defined aesthetic goals.

Despite the adoption of the TOD Specific Plan, no new residential or commercial buildings have been developed near the station since it opened. The existing land use patterns have not altered much, nor have the streetscape improvements envisioned in the specific plan emerged. Unlike the Hollywood/Vine and Pershing Square stations, housing transactions suggest that the real estate market near Vermont/Santa Monica has not been strong enough to support new, higher density development since the station opened. From the mid-1990s through the housing collapse in 2007, sales of small apartment buildings were modest but consistent, with average prices around $200,000 per unit. Beginning in the Great Recession, sales volume declined to fewer than ten sales per year, with prices around $150,000 per unit. In the absence of rising property values, TOD-compatible zoning and land use plans have not generated redevelopment.

Highland Park Station: Ambiguous zoning, emerging demand

Highland Park is an older neighborhood about six miles northeast of Downtown Los Angeles. The above-ground light rail station is located one block northwest of the neighborhood’s central commercial strip along North Figueroa Street (Figure 5). The strip is composed mostly of one- and two-story buildings dating from the 1900s to 1920s, currently
occupied by a mixture of retail and services, as well as an historic 1924 movie theater. Three-quarters of residents are Hispanic, and many of the businesses cater to Latino customers with services such as specialty foods, payment remittances, and immigration-oriented legal services. The side streets off Figueroa are mostly residential, with one- and two-story single-family and small multifamily buildings dating from the early 20th century, and a notable concentration of Craftsman buildings that are designated for historic preservation. Like the Historic Core in Downtown Los Angeles, in the past few years, the neighborhood has drawn attention – and controversy - from local and national media as an example of gentrification, with a growing population of younger, more affluent college-educated non-Hispanic whites (Clark, 2015).

Zoning in Highland Park is complex, governed by three sets of plans: the Northeast Los Angeles Community Plan (adopted 1999), the Highland Park Historic Preservation Overlay Zone (adopted 1994), and the Avenue 57 Transit Oriented Development Neighborhood Plan (adopted 2002). All three of these were in effect before the Gold Line began operations, although the Community Plan and TOD Neighborhood Plan were adopted during the rail system’s development. Figueroa Street is zoned for high density commercial use, while the majority of the surrounding neighborhood is zoned for medium-density residential (Table 1). Some existing commercial and residential structures are at or above currently allowable densities. The three plans not only have different rules governing allowable uses, dimensions, procedures, and other specific components, but goals stated in the plans reveal some contradictory expectations. For instance, the Community Plan largely frames development as a challenge to be controlled, rather than a desired outcome. It repeatedly mentions the need to separate commercial and residential uses – more typical of older, single-use zoning rather than the New Urbanist-inspired mixed-use TOD zoning – and calls for creating more parking to serve commercial areas. According to the
Community Plan, the TOD specific plan “is being prepared to regulate…and guide development so that the mistakes of the recent past are not repeated” (Community Plan p. I-5). Throughout the document, the destruction of historic buildings and loss of neighborhood character incurred by new development are referred to as “mistakes of the past”. These motivations are also frequently referenced in the HPOZ, which establishes procedural requirements to review any proposed demolition, alteration, or redevelopment of existing structures.

The language of the TOD Neighborhood Plan reflects an attempt to balance multiple economic, physical, aesthetic and social goals. The plan outlines some incentives – reduced parking requirements, increased FAR and streamlined approval process – designed to induce reuse of existing structures and introduce residential elements along Figueroa Street. The plan calls for live-work spaces for professional and creative occupations, and designates an “Artwalk” area that allows artistic production activities in residential areas. Although some density bonuses are offered in exchange for improving pedestrian amenities, the plan still stresses the need to maintain the “historic character” of the neighborhood, including “limiting the massing of parcels to maintain an appropriate scale of development”. It is unclear whether the type of land assembly and redevelopment which occurred at Hollywood/Vine would be allowed in Highland Park. The TOD Neighborhood Plan also outlines an ambitious set of social goals:

“maintain a diverse community, where people of many different ages, incomes, family formation types, and cultural perspectives will live, work and shop in harmony…support and expand the traditional local population of working writers and artists”.

No new development has occurred adjacent to the Highland Park Station or along the Figueroa Street commercial strip since the station opened, and minimal development has occurred in the adjacent residential neighborhood. Media reports on gentrification describe increased renovation and sales activity among older residential and commercial buildings in the
neighborhood since 2012, resulting in higher rents or sales prices, but it does not appear that these activities have yet increased building supply. The overall land use mix has not changed, although tenant turnover along Figueroa Street shows signs of commercial gentrification; upscale restaurants replacing fast food, for instance. Building permits suggest most commercial property renovations have been relatively modest, such as replacing HVAC systems or façade improvements. The residential property market around Highland Park is fairly active, with approximately 50 to 100 sales per year during the 2000s, including single-family and small multifamily buildings. Single-family house prices in recent years have averaged $300,000, while multifamily buildings sold for around $150,000 per unit. Residential sales volume and prices decreased sharply in the Great Recession and had not recovered by 2012. The strengthening real estate market suggests increasing demand for residential and commercial space near Highland Park. Whether new development occurs over the next few years likely depends on which of the many land use plans will dominate, and on political support from residents and public officials.

*Civic Center Station: Zoning limits TOD-compatible land uses*

The Civic Center station is located in the Civic Center sub-neighborhood of Downtown Los Angeles, two blocks west of City Hall and about 0.7 miles north of Pershing Square (Figure 6). The Central City Community Plan describes the neighborhood as the “governmental, financial and the industrial hub of Los Angeles”. Land uses near the station area are predominately city and county government buildings, a public park, and a large performing arts complex, including the Frank Gehry-designed Disney Hall and newly opened Broad Art Museum. There is limited housing and thus little residential population immediately adjacent to the station, but the station is within walking distance of the growing Historic Core.
The Civic Center station area has by far the highest employment density of the study stations; two-thirds of jobs are in public or institutional sectors.

Reflecting existing land uses, more than half the land near the Civic Center station is zoned exclusively for Public Facilities, with allowable uses limited to government buildings, fire and police stations, libraries, and similar public uses (Figure 6). On the south side of the station, parcels are zoned for high-density commercial and multifamily residential (Table 1). These parcels are occupied by large office and apartment buildings that were built prior to the station opening. The Central City Community Plan, adopted in 2003, encourages more residential growth, supporting locally-serving businesses, inducing more pedestrian oriented development, and taking advantage of unused office space. The plan calls for projects to “maximize the development opportunities of the future rail transit system while minimizing adverse impacts”.

No residential or commercial buildings have been developed around the Civic Center station within the last 25 years, nor has the land use mixture altered. The government office buildings were mostly built during the 1960s and 1970s, although new buildings for the Police Department and California Transportation Department were completed in the past five years. The most notable change in the physical environment near the station was the 2012 conversion of a surface parking lot into Grand Avenue Park, which extends several blocks east and west of the station (Figure 6). The park, which was developed by the City of Los Angeles, has landscaped open space and hosts public programs such as concerts and holiday celebrations. The

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9 For the Civic Center station, population characteristics are likely measured with error, because nearly all the residential population in adjacent tracts are located more than one-quarter mile from the station. Moreover, neighboring tracts differ widely along basic characteristics.

10 The ARO also applies to commercial buildings across downtown, but most office buildings near Civic Center are newer than those converted near Pershing Square and have been continuously occupied.
strong real estate market around Pershing Square suggests that there might be demand for residential or commercial development near Civic Center, but the current zoning combined with public land ownership are likely barriers to private-sector development near the station.

Discussion and policy implications

Los Angeles is among many large cities worldwide that are currently investing substantial resources to build intra-city rail systems. Local policymakers hope that, in addition to improving transportation flows, their investments will spur physical redevelopment around stations. Our results show considerable variation in redevelopment and land use change near five LA Metro stations. The neighborhoods in which these stations were built – downtown central business districts, mixed-use urban corridors and older residential neighborhoods -- have parallels in other car-oriented cities that are seeking to transform the built environment through rail transit, particularly those across the U.S., Canada and Australia. Although the institutional context varies across cities and countries, our research suggests some generalizable results of opening stations in densely built neighborhoods. Several conditions contribute to the probability of transit-oriented redevelopment: compatible zoning, strong real estate markets, active engagement by local government agencies, and (in most cases) political support from neighborhood residents.

Zoning is enormously complicated, often governed by multiple plans with potentially conflicting terms. Highland Park is the best example of multi-layered, possibly incompatible zoning and land use plans, but zoning around all five stations present non-trivial challenges for development. Complex rules and procedures may deter some owners from attempting to change existing uses or structures. Even for sophisticated and well-financed developers, the uncertainty
and length of the process will increase development costs, which will be passed on to households through higher prices or rents. Redevelopment will only occur where land values are high and it is possible to redevelop at substantially higher density than current buildings. Notably, near some stations with ostensibly TOD-friendly zoning, allowable densities for new buildings are lower than that of many existing structures. Whether zoning constitutes a binding constraint on development depends on the actions of public officials, and political pressure from constituents.

Underlying land values and real estate markets are highly localized, so incentives for redevelopment can vary considerably even within relatively small geographic distances. The Hollywood/Vine and Vermont/Santa Monica stations are located roughly 2.5 miles apart on the same rail line and within the same Community Planning area, yet the Vermont/Santa Monica area has substantially weaker demand. No development has occurred near the station – nor have existing house prices risen – despite the adoption of TOD-compatible zoning. This contrasts with some predictions in the literature, which assert that TOD will emerge naturally as long as zoning does not constrain it (Bernick and Cervero, 1997; Levine, 2006; Suzuki et al, 2013).

The public sector may behave passively or actively to affect redevelopment. The City of Los Angeles used eminent domain to assemble land and acted as development facilitator near Hollywood/Vine, and passed an Adaptive Reuse Ordinance which enabled new housing growth in Downtown Los Angeles (and other parts of the city). This active engagement near stations is relatively unusual within the city of Los Angeles. By contrast, the neighboring city of Pasadena adopted new zoning that increased allowable densities near all three Gold Line stations in downtown Pasadena at the time that Gold Line service began. The Hollywood/Vine case illustrates how public agencies can help address fragmented land ownership, a substantial market barrier to redevelopment in dense urban areas. Although eminent domain is an extreme form of
intervention, public agencies can maintain inventories of underused parcels and act as development facilitators in public-private partnerships. In most cities, the public agency responsible for planning, financing, and developing transit infrastructure (here, the county-wide LA Metro) does not directly have control over land use decisions. At most, regional transit agencies can offer incentives for local governments to alter zoning, as through LA Metro’s TOD Planning Grant program.11

Beyond the involvement of public agencies and officials, political support from neighborhood residents and/or within-city governing bodies matters. Los Angeles has a relatively strong city council and weak mayoral system, so support from relevant council members is critical to adopting compatible zoning or obtaining a variance. Moreover, the city’s Neighborhood Councils can mobilize residents in support of or opposition to both zoning changes and specific development projects. Facilitated by CEQA, opposition groups may bring legal action that delay or end development and zoning changes, as in the Hollywood Community Plan Update. The Highland Park case illustrates how ambivalent community sentiment may produce plans with conflicting goals and elements.

For the Metro stations that have seen new development, it seems highly unlikely that improved accessibility drove development. Public transit plays only a minor role in Los Angeles: transit mode share for the city is about 10 percent and rail accounts for only 1 percent (NHTS 2009), far lower than cities such as Boston, Chicago, or San Francisco. Under such conditions, the station itself cannot significantly influence land values. Both Hollywood/Vine and Pershing Square stations have relatively high ridership, but in Pershing Square, the

11 https://www.metro.net/projects/tod/
development is more closely attributable to the ARO than to the station opening. The Vermont/Santa Monica and Civic Center stations have comparable ridership to Hollywood/Vine, but have experienced no redevelopment. Los Angeles City and County leaders hope to promote station development in order to create the market for transit (and achieve other policy goals, such as increasing affordable housing). Zoning, local markets, and active public leadership are all critical factors in whether station areas redevelop.

This research also highlights some important measurement issues. In the sample neighborhoods, both new development and zoning are extremely difficult to measure accurately. The complexity of zoning has long challenged empirical researchers; even basic questions of what uses are permitted and at what density may be difficult to ascertain under multiple plans. Most large-scale quantitative analyses of real estate markets use sales price data from observed transactions or new building permits. These outcomes are less relevant in dense urban areas, where the existing building stock contains commercial buildings that transact infrequently and the housing stock is largely renter-occupied. And it is useful to consider smaller scale changes to the building stock – such as interior renovations and façade improvements – that may indicate rising property values in the short run but are not easy to track with existing data sources. Data limitations such as these enhance the utility of small-scale qualitative research in complement to larger quantitative studies.

The findings point towards several potential future research areas. First, what is a realistic time frame for new buildings and land use patterns to emerge around transit stations, particularly in dense urban areas? How do zoning and policy environments and underlying real estate market conditions affect timing of redevelopment? Second, what can planners do to increase the probability that local governments will adopt TOD-compatible zoning when they
expand transit systems? Equally important, how can public officials build support (or defuse opposition) for higher-density development among neighborhood residents? Investigating these questions across different economic, political and institutional contexts, including in multiple cities and countries, would enhance policymakers’ ability to maximize the return to public investments in rail transit.
References


City of Los Angeles. (2006) Memorandum from Richard Benbow, Acting Chief Executive Officer, Community Redevelopment Agency of the City of Los Angeles to Agency Commissioners.


Figure 1. Rail stations and employment centers in Los Angeles County

Note: Location of employment centers taken from Giuliano et al (2015).
Figure 2. Hollywood/Vine station

Source: ZIMAS, photos taken by authors (Jan 2016).
Figure 3. Pershing Square station

Source: ZIMAS, photos taken by authors (Jan 2016).
Figure 4. Vermont/Santa Monica station

Source: ZIMAS, photos taken by authors (Jan 2016).
Figure 5. Highland Park station

Source: ZIMAS, photos taken by authors (Jan 2016).
Figure 6. Civic Center station

Source: ZIMAS, photos taken by authors (Jan 2016).
Table 1. Station area characteristics and development outcomes

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<th>Vermont/Santa Monica</th>
<th>Highland Park</th>
<th>Civic Center</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOD-compatible zoning</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Uncertain</td>
<td>No</td>
</tr>
<tr>
<td><strong>Real estate market strength</strong></td>
<td>Strong</td>
<td>Strong</td>
<td>Weak</td>
<td>Increasing</td>
<td>Strong</td>
</tr>
<tr>
<td><strong>Post-station redevelopment</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geographic area</td>
<td>Hollywood</td>
<td>Downtown LA</td>
<td>East Hollywood</td>
<td>Arroyo Seco</td>
<td>Downtown LA</td>
</tr>
<tr>
<td>Year station opened</td>
<td>1999</td>
<td>1993</td>
<td>1999</td>
<td>2003</td>
<td>1993</td>
</tr>
<tr>
<td>Line(s) served</td>
<td>Red</td>
<td>Purple, Red</td>
<td>Red</td>
<td>Gold</td>
<td>Purple, Red</td>
</tr>
<tr>
<td>Avg. daily boardings (2013)</td>
<td>6,175</td>
<td>10,503</td>
<td>5,860</td>
<td>2,718</td>
<td>6,107</td>
</tr>
<tr>
<td>Plan name (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neighborhood characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population per acre</td>
<td>245</td>
<td>77</td>
<td>189</td>
<td>86</td>
<td>117</td>
</tr>
<tr>
<td>Median household income</td>
<td>36,983</td>
<td>20,822</td>
<td>32,529</td>
<td>45,013</td>
<td>18,411</td>
</tr>
<tr>
<td>Black (%)</td>
<td>6</td>
<td>14</td>
<td>4</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Hispanic (%)</td>
<td>32</td>
<td>21</td>
<td>67</td>
<td>76</td>
<td>18</td>
</tr>
<tr>
<td>1-4 family housing (%)</td>
<td>10</td>
<td>1</td>
<td>15</td>
<td>59</td>
<td>2</td>
</tr>
</tbody>
</table>

Notes: Station opening date and average daily boardings obtained from the MTA. Information on zoning ordinances and other plans assembled from the Los Angeles City Planning Department. Development outcomes from DataQuick housing transactions, Los Angeles County Tax Assessor, and City of Los Angeles Department of Buildings. Neighborhood characteristics from 2005-09 American Community Survey, calculated as weighted average of census tracts surrounding station area.