



# Clean slate: Land-use changes in San Francisco after the 1906 disaster



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## ABSTRACT

The 1906 San Francisco fire, which destroyed thousands of buildings, provided a blank canvas upon which to reshape the city. After reconstruction, and at a time of immense growth in the city, developers shifted land out of residential uses and into nonresidential uses in burned areas relative to unburned areas. They facilitated this transition by rebuilding far fewer single-family dwellings compared to other types of housing, which suggests that houses inhibited the conversion of land to nonresidential uses before the fire. Aside from these broad effects, the fire also released new economic potential in areas that had shown little indication of shifting into nonresidential land uses before 1906, thereby creating new clusters of business activity. These impacts of the fire are still evident today—in roughly the same magnitudes and places—which suggests that the economic benefits realized upon reconstruction continue to drive the city's land-use patterns.

## 1. Introduction

In any city, the past can constrain the present. Old buildings, for instance, reflect decisions made in a bygone era and act as anchors to the moving vessel of change. While these buildings reflect the economic conditions of their day and developers' expectations for the future, they nonetheless could miss the mark. But a catastrophic event can provide an opportunity to revisit these past decisions and make changes more in line with contemporary needs. One of the largest catastrophes in U.S. history occurred in San Francisco in 1906 when an earthquake jolted the city and ignited a massive fire. The fire itself razed thousands of buildings, thereby creating an enormous amount of vacant land at a crucial time in the city's history. With this clean slate, developers could more easily adjust land use as they rebuilt from the devastation. The impact of the fire thus provides insight into how large shocks can reshape urban settings and the degree to which old buildings stand in the way of change.

Cities often burned in the nineteenth and early twentieth centuries. While destructive, urban fires also provided new opportunities in rebuilding. In San Francisco, residential density increased significantly in burned areas relative to unburned areas after the fire in 1906 (Siodla, 2015). Anecdotal evidence suggests that the spatial patterns of businesses and residents changed after major fires in Chicago, Boston, and Baltimore (Rosen, 1986). After Boston's fire in 1872, land values rose significantly, reflecting the value of vacant urban land and the positive spillovers generated by newer and better buildings (Hornbeck and Keniston, 2016). In Chicago, industrial and commercial interests established a foothold in prime areas after the 1871 fire (Fales and Moses, 1972).<sup>1</sup> Large fires often resulted in significantly altered urban environments.

Big shocks can also impact city systems, if only temporarily. World War II bombing in Japanese cities impacted population growth and industrial employment in the short-term (Davis and Weinstein, 2002, 2008), and the same holds for city populations in

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<sup>1</sup> Fales and Moses (1972) do not consider pre-fire land-use patterns, and thus there is no relative comparison to a period before the fire.

West Germany after the war (Brakman et al., 2004). In Vietnam, U.S. bombing did not permanently impact urban poverty levels or population densities (Miguel and Roland, 2011). These results suggest that urban growth patterns are often determined by locational fundamentals, or geography.

But self-reinforcing agglomeration economies, or increasing returns, can also play a role in determining urban outcomes (Bosker et al., 2007, 2008; Redding et al., 2011; Ahlfeldt et al., 2015; Imaizumi et al., 2016). Cities still exist in areas where the initial driver of settlement no longer matters, such as along old portage sites in the U.S. (Bleakley and Lin, 2012), and near historical railroad investments in Africa (Jedwab and Moradi, 2016; Jedwab et al., 2017) and Sweden (Berger and Enflo, 2017). Path dependence is also seen within cities. For example, areas near defunct streetcar stops are still very densely built in Los Angeles (Brooks and Lutz, 2014), and the housing density gap that emerged in San Francisco after the 1906 fire still largely exists (Siodla, 2015). The age of the housing stock can also influence neighborhood development cycles and thus contribute to the long-lasting location patterns of the urban rich and poor (Rosenthal, 2008; Brueckner and Rosenthal, 2009). All this suggests that history matters in the study of cities.

This paper adds to the literature on shocks, persistence, and urban settings by estimating the 1906 fire's short- and long-run impacts on land use in San Francisco. Using burned and unburned city blocks at the boundary of the fire—which were otherwise similar except for the fire's impact—the study employs a border-discontinuity approach and differences-in-differences (DID) methodology to estimate changes in land use over the years 1900, 1905, 1914, 1931, and 2011. Overall, relative to unburned blocks, residential land shares on burned blocks fell while nonresidential land shares rose by 1931. The study also provides insight into what held the city back from making these changes before 1906: the presence of old residential buildings. In reconstruction, developers built relatively fewer of these buildings, and the majority of the reduction came through single-family houses. Also, aside from merely expanding nonresidential uses in many neighborhoods, the fire created economic opportunities in new areas, resulting in clusters of business activity that emerged only in the wake of the disaster. These effects of the fire still remain today, and thus large shocks can be sufficient catalysts for permanently reshaping urban settings.

## 2. Historical background

### 2.1. Land use in San Francisco before 1906

Migrants stormed San Francisco in the nineteenth century in search of economic opportunity (Stewart, 2012; Walker, 2000). With this foundation, the city flourished. San Francisco's population grew 15 percent between 1890 and 1900, making it the eighth-largest city in the U.S. as the twentieth century began (Issel and Cherny, 1986, pp. 23–24, Table 1). This growth in residents was matched by an expansion of the workforce, which rose by 11 percent in that decade (Issel and Cherny, 1986, p. 54, Table 3).<sup>2</sup> Manufacturing, in particular, was strong between 1899 and 1904, a time in which the number of factories increased nearly 30 percent (Douty, 1977, p. 366, Table 29). As a consequence of all this growth, assessed real estate values—a barometer of a city's economic activity—rose steadily between 1900 and 1906 (SFMR (1904–1916)).<sup>3</sup>

Leading up to the fire, the real estate market was experiencing historically high prices and unprecedented transaction volumes (San Francisco Real Estate Circular, December 1906, p. 4). The rise in real estate values was greatest for properties useful for retail and wholesale business in 1903 (San Francisco Real Estate Circular, November 1903, p. 3).<sup>4</sup> And by 1905, while in high demand, these properties were scarcely for sale in desirable areas (San Francisco Real Estate Circular, February 1905, p. 1). Buyers in these markets were prevalent while sellers were not, thus indicating a need to allocate more land to uses other than housing. This need was so great that investors in business property began going to parts of the city outside the central core at this time (San Francisco Real Estate Circular, December 1903, p. 2).

As in many old cities, firms and industries in San Francisco preferred central locations for the benefits of agglomeration and access to transport terminals to save on the cost of shipping and moving goods. But consumers also demanded locations near the center of the city to save on commuting costs. Thus, for firms and residents, land rent—or willingness to pay—falls with distance to the city's center. Since it is relatively more expensive to move goods than move people, land rent for firms falls faster with distance to the center than it does for consumers, a feature that helps explain central area business clustering and distant housing in old cities (Moses and Williamson, 1967).<sup>5</sup> In San Francisco, heavy investment in electric streetcar lines began changing the landscape before 1906, connecting outlying residential neighborhoods with the center of the city (Issel and Cherny, 1986, p. 30). Along with old cable cars, streetcars lowered the cost of commuting, allowing residents to live farther from downtown and thus encouraging steady suburban growth in the early 1900s. Consequently, outlying areas experienced heightened real estate activity just before the fire (San Francisco Real Estate Circular, April 1905, p. 1). Meanwhile, land nearer the city center was still highly developed with buildings and uses that might otherwise serve a better purpose.

Talk of better purposes for land was prevalent in San Francisco before 1906. An illustrative example concerns the changes proposed by Daniel Burnham, an architect and urban planner, in an ambitious plan presented to the city just days before the fire.

<sup>2</sup> The workforce consists of those employed in professional services, domestic and personal services, trade and transportation, and manufacturing and mechanical industries.

<sup>3</sup> As Siodla (2015) shows, higher land values encouraged housing developers to begin building denser forms of housing (i.e., apartment buildings) in these years. This move toward density in housing was a national trend in the early twentieth century (Barrows, 1983).

<sup>4</sup> While it is not clear whether the price appreciation of retail and wholesale properties was for plots with buildings used for these purposes, or for properties located in areas advantageous for these types of businesses, it nonetheless suggests a strong overall demand for more nonresidential space in the city.

<sup>5</sup> See Chapter 5 in DiPasquale and Wheaton (1996) for a detailed discussion of the model described here in the context of old cities.

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