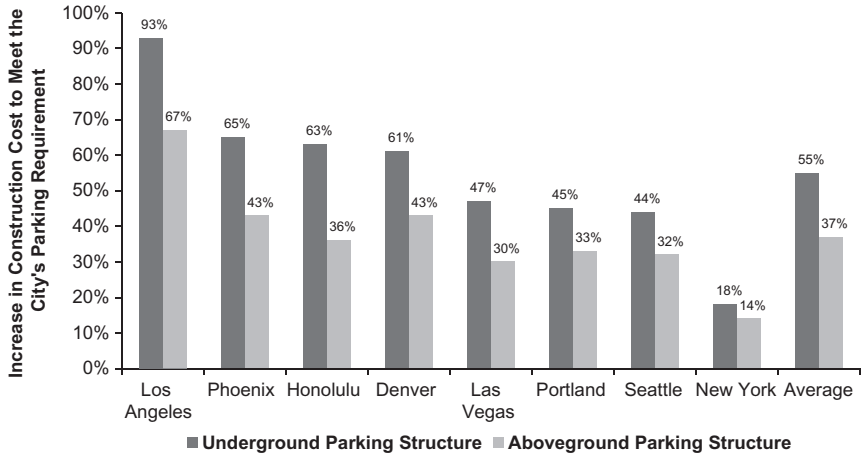

Fig. 3. How Parking Requirements Increase the Cost of Constructing Shopping Centers.

Cutter and Franco (Table 10) also estimated how much an additional parking space adds to a building's value. For retail service buildings with high parking requirements such as restaurants, the last parking space cost $14,700 more than it added to the building's value.[7] High parking requirements thus force developers to provide parking spaces that lose money. In effect, parking requirements tax buildings to subsidize parking. Cutter and Franco (2012, p. 919) conclude, "minimum parking requirements lower site density, increase land consumption, oversupply parking and reduce profits per unit of covered land."

THE COST OF PARKING REQUIREMENTS FOR APARTMENT BUILDINGS

City planners cannot predict how many parking spaces an apartment needs any more than they can predict how many cars a family needs. But the parking requirements for apartments help to predict how many cars a family will own. Even when planners try to measure the "need" for parking by observing the number of cars parked at existing buildings, they often require too much. Seattle's Right Size Parking Project, for instance, surveyed occupancy at over 200 apartment buildings in the region in 2012. The parking requirements in suburban Seattle were, on average, 0.4 spaces

per dwelling unit greater than the observed parking occupancy (King County Metro, 2013, p. 11). Table 1 shows that underground parking costs $35,000 per space in Seattle, and aboveground parking costs $25,000 per space. These figures suggest that the parking requirements in suburban Seattle require developers to spend between $10,000 (0.4 × $25,000) and $14,000 (0.4 × $35,000) per apartment to provide unused parking spaces.

The typical requirement of two spaces per apartment forces developers to spend at least $70,000 per dwelling unit for parking if the spaces are underground, or $50,000 per dwelling unit if the spaces are in an aboveground structure. These estimates refer to the *average* cost of building a parking space. The *marginal* cost of a parking space, however, can be far higher due to natural break points in the cost of building a parking structure. For example, a dramatic break point occurs with the construction of a second level of underground parking because it requires removing several spaces on the first level to provide a ramp to the lower level. Therefore, the marginal cost of the first space on the second level can be far higher than the average cost of the spaces on the first level. This high marginal cost of excavating a second parking level severely limits what developers can build on a site.

To demonstrate how break points in the cost of building a garage affect development decisions, Fig. 4 shows a four-story apartment building in Los Angeles on a typical lot that is 50 feet (15 meters) wide and 130 feet

Fig. 4. Seven-Unit Apartment Building on a 50 × 130 Foot Lot (47 Units per Acre).

Fig. 5. Tandem Compact Parking Space in Underground Garage.

(40 meters) deep. The city's R3 zoning allows eight apartments on the site, and the city's parking requirement is 2.25 spaces per unit. Eight apartments would therefore require 18 parking spaces (8×2.25), but only 16 spaces could be squeezed onto one level of underground parking (Fig. 5 shows how tightly the spaces are packed).[8] In response, the developer built only seven apartments on the site, rather than excavate a second level of parking to provide two additional spaces for the eighth apartment.

In this case, the parking requirement, not the density allowed by zoning, constrained the number of apartments. If the city had allowed the developer to provide only two parking spaces per apartment, the developer could have built eight apartments and 16 parking spaces. The prohibitively high *marginal* cost of two more spaces on a second underground level, however, reduced the feasible number of dwellings from eight to seven, or by 13 percent.

Repealing or reducing a city's parking requirement does *not* mean that developers won't provide parking. Even without parking requirements, the developer in the example above would probably have built a garage with 16 spaces, because the site told the developer that 16 spaces were feasible. With parking requirements, however, the garage told the developer that

only seven apartments were feasible. More parking for cars means less housing for people.

By increasing the cost of development, parking requirements can reduce the supply and increase the price of real estate in two ways. First, parking requirements can reduce the density of what gets built, as in the 13 percent reduction in apartments in the example above. Parking requirements increase the density of cars but reduce the density of people (Manville, Beata, & Shoup, 2013). Because parking requirements reduce the supply of apartments, they increase the price of housing. On some days, planners think about housing affordability, but on most days they think about parking and forget about housing affordability.

Second, parking requirements not only reduce the density on sites that are developed, but also reduce the number of sites that are developed. If the required parking spaces increase the cost of constructing a building by more than they increase the market value of the building, they will reduce the residual value of land. Residual land value is defined as the market value of the most profitable development that could be constructed on a site minus the cost of constructing it.[9] For example, if the best choice for development on a site would cost $750,000 to construct and would have a market value of $1 million, the residual value for the land is $250,000. If $250,000 is not enough to pay for buying and demolishing an existing building on the site, redevelopment won't happen. The residual land value of a site for redevelopment must be greater than the value of the existing building on the site before a developer can buy the building, clear the site, and make a profit on a new development. Therefore, if minimum parking requirements reduce residual land values, they make redevelopment less likely.

In their analysis of parking requirements for retail services, Cutter and Franco (2012) found that the last parking space adds $14,700 more to a building's cost than it adds to the building's value. Requiring one more parking space at a proposed restaurant thus reduces the residual land value of the site by $14,700. Where parking requirements reduce residual land values, they will reduce infill redevelopment. This reduction in the supply of real estate drives up the price of everything except parking and shifts the cost of parking from drivers onto all economic activity in the city.

THE COST OF PARKING REQUIREMENTS FOR HISTORIC BUILDINGS

Cornell professor Michael Manville (2013) showed how parking requirements can reduce the supply of housing by preventing the reuse of historic