


# Charging for Parking to Finance Public Services

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## Abstract

Many cities have two serious problems: overcrowded on-street parking and undersupplied public services. This article examines a policy to address both problems: charge market prices to manage on-street parking and use the revenue to finance local public services. Our case study of a pilot program for alley improvements in Beijing finds that the estimated payback period for the investments in sanitation, security, landscaping, and parking is less than three years. Only 35 percent of households in the pilot program own a car and the average income of car-owning households is almost three times the income of carless households.

## Keywords

parking, public finance, land economics, neighborhoods, equity

If it is feasible to establish a market to implement a policy, no policy-maker can afford to do without one.

J. H. Dales

Around the world, many low-income neighborhoods have two serious problems: overcrowded on-street parking and undersupplied public services. One policy can address both problems: charge fair market prices for on-street parking to manage demand and use the resulting revenue to finance local public services. We address four research questions. First, can market-priced on-street parking yield enough revenue to pay for substantial public services? Second, is this policy efficient? Will the benefits exceed the costs? Third, is this policy fair? How will the benefits and costs be distributed? And fourth, is this policy politically feasible? Will a large majority of the affected residents see large net benefits? We examine these questions by studying a pilot program for alley improvements in Beijing, China.

## Land-Based Public Revenue

Charging for parking to finance public services draws on the ideas of nineteenth-century reformer Henry George. In *Progress and Poverty* (George [1879] 1992), George argued that land rent is the most appropriate source of government revenue. In the most ambitious form of his proposal, George maintained that a tax on land (the “single tax”) could produce enough revenue to replace all other taxes in the economy. Many contemporary economists considered George a radical, or even a crackpot, but his ideas attracted a huge popular following. As economic historian Mark Blaug (1992, ix) wrote, “in the English-speaking world in the last quarter of the nineteenth century it wasn’t Marx but Henry George

who was the talking-point of all debates among fiery young intellectuals.” After initially opposing George and then ignoring him, most economists now agree with his central proposition about using land rent to pay for public services. Richard Arnott and Joseph Stiglitz (1979) showed that, under certain assumptions, total land rent in a city equals the total expenditure on municipal public goods. In homage to the idea’s originator, Arnott and Stiglitz dubbed their finding the “Henry George Theorem.”

Although George’s ideas gained worldwide attention, few cities adopted his proposal to tax land but not buildings. Nevertheless, some countries use special assessments or betterment levies to recapture increases in land values caused by specific public investments, such as sidewalks and sewers (Borrero Ochoa 2011; Doebele 1998; Lin and Zhang 2015; Shoup 1994; Smolka 2012). Some countries also capture the increase in value when land is converted from rural to urban use. Zhao and Webster (2011, 530) explain this process in China:

Central to this business model is the Chinese state’s monopoly of the primary land market: only the state (municipal) government can legally convert rural land into urban land . . .

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**Figure 1.** Cars parked on a sidewalk in Beijing.  
Source: Donald Shoup.

this business model has fuelled the rapid urbanisation of Chinese cities for over a decade. Underpinning the model is an assumption that the uplift in land values caused by urban development (betterment value) should be retained by the state and not be shared with private individuals.

In Shanghai, land-based revenues accounted for 35 percent of all local revenue and over 50 percent of total revenue growth between 2006 and 2010 (Bahl and Linn 2014, 33). Using land value to finance public services is a long tradition in China. Sun Yat-sen, the first president of the Chinese republic, modeled his proposals for land reform on Henry George's work (Bergère 1998, 168–71). In 1912 Sun told an interviewer, "The teachings of your single-taxer, Henry George, will be the basis of our program of reform" (Trescott 1994, 370).

Although parking spaces are the smallest parcels of land that are commonly rented, market-rate prices for them can yield substantial revenue (Shoup 2011, 513–19). Charging for on-street parking to finance public services thus resembles Henry George's proposal, albeit on a small scale (Shoup 2011, chapter 19).

Parking fees for on-street parking are user charges, not taxes. Economists and planners who study public finance in developing countries often recommend user charges to finance local services, but this advice is usually ignored. As Bahl, Linn, and Wetzel (2013, 14–15) explain,

The primary reason for the poor experience with user charges is the politics of raising the price of services that are often considered as necessities and hence the concern that user charges are highly regressive. More likely, the resistance is from those who use the services most heavily, who usually are not poor, and who basically object to the removal of a subsidy that they have enjoyed. Moreover, users resist paying higher charges when services are of low quality or only intermittently provided, which is often the case in cities in low-income countries.

Our study examines whether charging for parking to finance public services can overcome this political barrier to user charges.

## Overcrowded On-Street Parking

Where all the legal on-street parking is saturated and enforcement is weak, many drivers resort to parking illegally in spaces intended for other uses. Consider the parking chaos reported in Mexico City:

Cars dominate nearly every square inch of Mexico City's public space. Vehicle owners double- and triple-park on the streets, to say nothing of curbs, sidewalks, gardens, alleys, boulevards and bike paths. (Dickerson 2004)

Similar parking problems occur in many other cities around the world (Centre for Science and Environment 2009; Barter 2011; Ríos, Vicentini, and Acevedo-Daunas 2013; Institute for Transportation and Development Policy 2015). When illegally parked cars are not regularly ticketed, they will take over sidewalks, alleys, bike lanes, and many other public spaces (Shoup 2014a; Institute for Transportation and Development Policy 2015, 93–98). Figure 1 shows a familiar scene of cars parked on the sidewalk in Beijing.

The most effective way to manage parking and prevent overcrowding is to charge the right price for it. Some cities have begun to charge demand-based prices for on-street parking to manage the occupancy rate (Pierce and Shoup 2013; Chatman and Manville 2014). These cities set their meter prices by location and time of day to produce one or two open spaces on every block. This policy can be called the Goldilocks Principle of parking prices: the price is too high if many spaces are open and too low if no spaces are open. But if one or two spaces are open on a block, drivers can reliably find an open curb space at their destination and the price is just right. Everyone will see that curb parking is both well used because most spaces are occupied and yet readily available because new arrivals can always see a convenient place to park.

Because new parking technology (such as occupancy sensing and license-plate-enabled payment and enforcement) has solved the practical problems of charging market prices for curb parking, the remaining problems are political.

## Parking Benefit Districts

To solve the political problems of charging for curb parking, some cities have appealed to local stakeholders by spending the meter revenue in the metered areas. If all the meter revenue disappears into a city's general fund, few businesses or residents will want to charge for on-street parking. But dedicating the revenue to pay for neighborhood public services can create local support for priced parking. Some cities have created Parking Benefit Districts that offer each neighborhood a package including both priced on-street parking and improved public services financed by the parking revenue. Prices manage the parking and the public services improve the neighborhood.



**Figure 2.** A hutong before cars were introduced.  
Source: Danny Yee.

Everyone who lives, works, or owns property in the district can then see the benefits paid for by the parking revenue (Kolozsvari and Shoup 2003; Sañudo et al. 2013).

Old Pasadena, a historic business district in Pasadena, California, illustrates the potential of Parking Benefit Districts. The district improved dramatically after the city used on-street parking revenue of more than \$1 million a year to rebuild the sidewalks, plant street trees, add historic street furniture, and increase police patrols (Shoup 2011, chapter 16). Parking revenue earned in Old Pasadena helped to convert a former commercial skid row into a popular destination. Following the example of Pasadena, several other cities, including Austin, Houston, Mexico City, and San Diego, commit parking revenue to finance public services in the metered districts.

Will Parking Benefit Districts also work in low-income countries? To help answer this question, we examine the case of a historic neighborhood in Beijing. Because 56 percent of the 973,000 parking spaces in central Beijing are free, the untapped revenue potential of priced parking is promising (Wang and Yuan 2013, 111). Although our case study focuses on a specific neighborhood in Beijing, the findings should be relevant for any neighborhood where (1) on-street parking is undermanaged and overcrowded, (2) public services are undersupplied, (3) land values are high, (4) most residents do not own a car, and (5) the residents who do own a car have higher incomes. Parts of many cities, especially in Asia, Africa, and Latin America, fit these five criteria.

### Parking Spaces and Public Services in Hutongs

The Chinese word *hutong* refers to narrow alleys found in historic neighborhoods in Beijing. They are similar to the streets in low-income parts of many older cities around the world. Figure 2 shows a hutong before cars arrived.



**Figure 3.** Unregulated parking and resulting traffic in a hutong.  
Source: Shihuixiong.

### Regularized Parking

Hutongs are typically between three and nine meters wide. Parking is prohibited in alleys that are narrower than six meters, and is permitted in wider alleys only in legal spaces that are marked by lines painted on the roadway (Beijing Municipal Government 2001, 2007). Nevertheless, because car owners have nowhere else to park, illegal parking has become a widespread practice tolerated by the authorities (Figure 3). Traffic police usually issue tickets for violating the law only if a parked car severely obstructs an alley.

Many drivers avoid using their cars because parking will be difficult when they return. Some have devised ingenious tricks to preserve their parking spaces when they do leave, such as erecting temporary sheds to prevent anyone else from parking (Yang 2016). In effect, car owners privatize public land by encroaching on the streets.

Because thousands of Beijing drivers now park illegally, enforcing the regulations is politically difficult. Cars often occupy much of the road and sidewalk space planned for cyclists and pedestrians, and the share of cars parked illegally has been estimated to be as high as 45 percent (Wang and Yuan 2013, 113). The best solution may therefore be to regularize and charge for parking, taking into account the needs of pedestrians, cyclists, delivery vans, emergency vehicles, urban design standards, and the residents' demand for parking spaces. Regularized on-street parking spaces can also complement Beijing's plan to require residents to prove they have a parking place before they can purchase a vehicle (Jaffe 2015). Without legally enforceable on-street parking permits, on-street spaces cannot serve as proof of available parking for residents who want to buy a car.

Regularizing informal on-street parking implies marking the boundaries of spaces and assigning the rights to use them. This regularization has two main benefits. First, it makes parking more convenient and reduces the traffic chaos caused by illegal parking. Second, it creates the opportunity to charge for

on-street parking and thus produce revenue to improve public services.

### Improved Public Services

Crowded on-street parking is not a public good or a market failure. It is instead a publicly owned good and a public pricing failure. Crowded on-street parking stems from a classic commons problem: No one owns the parking spaces and anyone can use them (Shoup 2011, 7–9, 594–600). A Parking Benefit District can convert a parking commons into community revenue, and neighborhoods will capture the economic and social value of their streets.

Parking Benefit Districts are locally governed public enterprises that charge for on-street parking and spend the revenue for public services. If cities spend the revenue from on-street parking to pay for desired public services, many residents, especially those who do not own a car, may support charging market prices for parking in their neighborhoods.

While most hutongs have running water, electricity, and even Internet access, many do not have sanitary sewer connections, so all the residents must use public toilets. Clean public toilets may be the most highly desired but undersupplied public service, as described in the *China Daily* (2012b):

Public toilets are not conveniences, they are necessities. But by and large, our public toilets are execrable. For years, the World Toilet Organization, a global, non-profit institution committed to improving and maintaining the cleanliness of public toilets worldwide, has ranked China as the country with the worst public toilets in Asia. . . . Yet for millions of people living in the older areas of Beijing and hundreds of cities beyond, public amenities are the only toilet facilities available to them. They have no other choice. Surely they have the right to enjoy sanitary washrooms.

The China National Theatre Company even produced a play, “Toilet,” set in a shabby public toilet:

The curtain opens on an amazing and unbelievable scene: Six men shoulder to shoulder are squatting in a public latrine, apparently doing their business. On the other side of the divider squat two women. . . . Inside the short grey walls, the neighbors manage their movements over the shabby pits while chatting with each other, without any show of awkwardness at all. Outside, many others are waiting in line, expressing their views on political events. Occasionally, a lady comes to rinse out the family chamber pot. (*China Daily* 2004)

Unsanitary public toilets are a particularly serious problem in hutongs (*China Daily* 2012a). Because many alleys have overcrowded parking and unsanitary public toilets, we examine whether charging for on-street parking can yield enough revenue to provide clean public toilets. More convenient parking for drivers and better toilets for everyone may create the popular support necessary to regularize and charge for on-street parking.

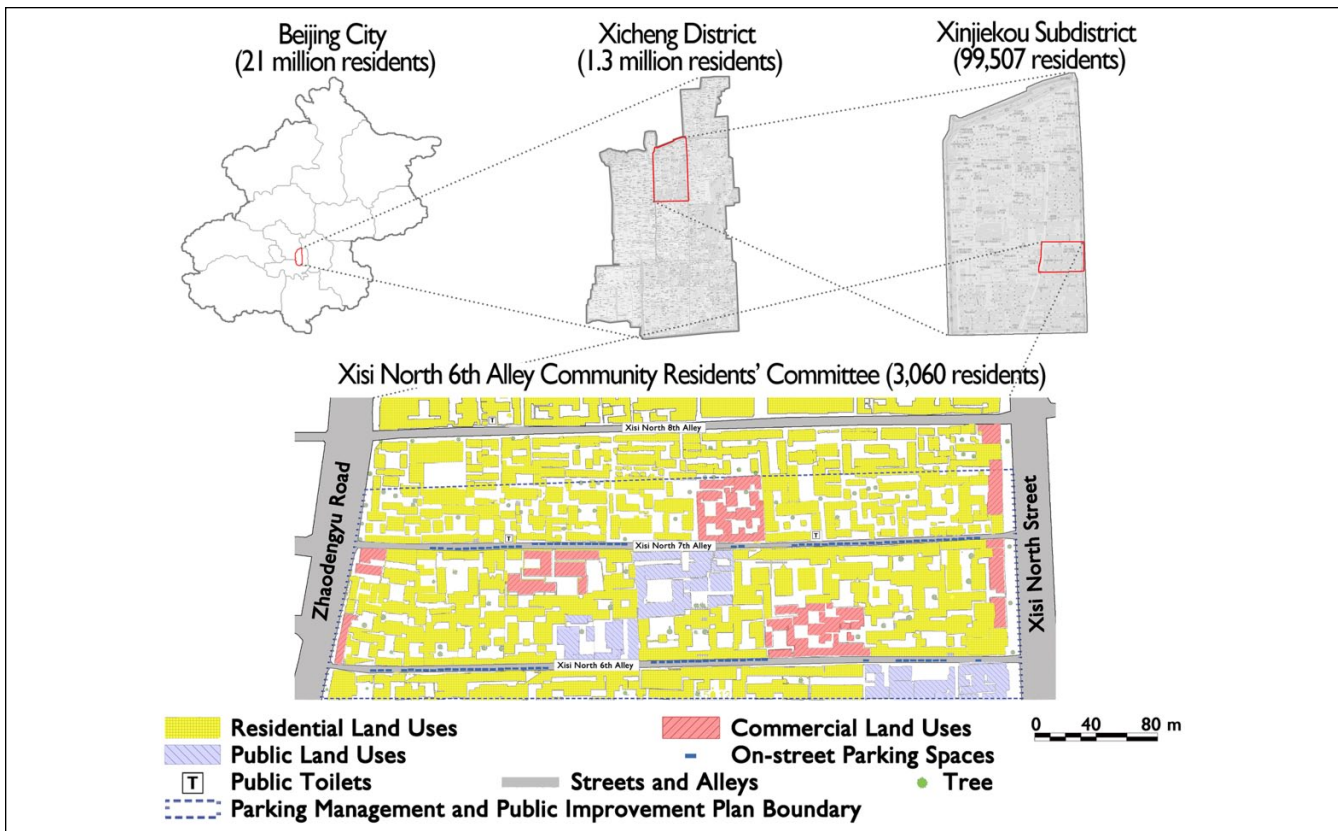
### A Pilot Program to Regularize Parking Spaces and Improve Public Services

Before a city can charge for parking, it must first mark the legal spaces and enforce the regulations. Fortunately, we have an example where Beijing piloted a program to regularize parking and provide public services in two alleys. The program was proposed by the Xisi North 6th Alley Community Residents’ Committee, which supervises the North 6th, 7th, and 8th Alleys. Figure 4 shows how the Alley Residents’ Committees fit into Beijing’s governmental hierarchy. The lowest level of city government is the Subdistrict. Within each Subdistrict, the Residents’ Committees help to manage the communal spaces and can receive funds from the government to finance neighborhood services. The Xisi North 6th Alley Community Residents’ Committee had tried to improve the sanitary and environmental conditions in its neighborhood but made little progress until it proposed a Public Improvement and Parking Management program for the North 6th and 7th Alleys, which was adopted in 2012. After incorporating the idea of parking management, the Residents’ Committee received financial support for the start-up and operating costs from the Xijiekou Subdistrict Office for the pilot program.

For our case study, we focused on North 7th Alley, a typical hutong in central Beijing with 247 households and about 660 residents. The Residents’ Committee played a central role in initiating and executing the program. Local residents manage the parking, and private firms provide the new public services.

The parking management part of the program aims to prevent illegal parking, remove obstacles used to secure vacant parking spaces, and reserve parking for alley residents. The plan includes several measures to achieve these goals. First, the boundaries of legal spaces are clearly marked on one side of each alley. Figure 4 shows the regularized parking spaces in 6th and 7th Alleys as rectangles, and Figure 5 shows some of these spaces. No parking is permitted outside the regularized spaces. Second, each resident who owns a car is issued a permanent parking permit, and temporary parking permits are available for residents’ guests. There are more permits than parking spaces, however, and no one is guaranteed a space. Third, “No Parking for Outside Vehicles” signs are placed in the alleys, and the Council hires local residents to enforce the regulations. Everyone benefits from removing the illegally parked cars that block access for pedestrians, cyclists, delivery vans, and emergency vehicles.

The pilot program also improves public services. Government employees clean the public toilets (Figure 6). Surveillance cameras and 24-hour patrol officers increase security. Private firms provide other services including street cleaning, trash collection, and landscape maintenance.



**Figure 4.** Parking management and public improvement in two alleys.  
Source: Quan Yuan and Donald Shoup.



**Figure 5.** Regularized parking spaces in Xisi North 7th Alley.  
Source: Xin Jiang.



**Figure 6.** Public toilet in Xisi North 6th Alley.  
Source: Xin Jiang.

## Financial Analysis

### Capital and Operating Costs

Parking is free in the pilot program, and a subsidy from the Subdistrict government pays to provide the public

services. We can, however, estimate whether parking charges could replace the subsidy for the pilot program. Tables 1 and 2 show the program's capital and operating costs for 7th Alley. The capital costs, which were mainly for sanitation, landscaping, and parking regularization, totaled about \$62,000 (¥380,000). The operating costs,

**Table 1.** Capital Costs for the New Public Services.

Type of Public Service	Improvements	Cost
Sanitation	Smart trash bins and bags	\$24,575
Public security	Surveillance camera and security gates	\$455
Landscaping	Construction of plant ponds and purchase of plants	\$21,667
Parking regulation	Road pavement, lining the parking spaces, and issuing parking permits	\$15,303
Total capital cost		\$62,000

Source: Parking management archives of the Xisi North 6th Alley Community Residents' Committee.

**Table 2.** Operating Costs for the New Public Services.

Type of Public Service	Personnel Employed	Monthly Salary per Employee	Annual Operating Costs
Toilet cleaning	Three toilet cleaners	\$277	\$9,972
Neighborhood sanitation	Two street cleaners	\$277	\$6,648
Security patrol and parking management	Two guards	\$333	\$7,992
Total operating costs			\$24,612

Source: Parking management archives of the Xisi North 6th Alley Community Residents' Committee.

which are mainly for the salaries of toilet cleaners, trash collectors, and patrol officers, are about \$24,600 (¥150,000) a year.

According to the Director of the Alley Community Residents' Committee, many other neighborhoods with chaotic parking and poor public services would like to see similar improvements, but government subsidies are not available to replicate the pilot program in most neighborhoods. Can charging market prices for on-street parking yield enough revenue to finance the capital and operating costs of similar programs in other neighborhoods? To answer this question, we examine the potential parking revenue in 7th Alley.

### Revenue from On-Street Parking

Cities can use several non-price ways to distribute parking permits among residents (such as by a lottery), but charging for the permits is the only way to produce revenue to pay for public services. Auctioning the permits is the simplest way to establish the right price for on-street parking in a residential neighborhood. Beijing auctions land for residential, commercial, and office uses, and several Chinese cities auction license plates (Yang, Ren, Liu, and Zhang 2015; Feng and Qiang 2013). Therefore, using an auction to distribute public land for parking has well-established precedents.

A special type of auction, called a uniform-price auction, is often used when a large number of identical items are sold, and some American universities use uniform-price auctions to sell parking permits (Lewis 2010; Malvey and Archibald 1998; Van Horn 2014). Consider how a uniform-price auction could allocate the permits in 7th Alley, where there are fifty-two parking spaces. Suppose each resident of the alley

can submit a bid for one permit. The bids are ranked in descending order and the highest fifty-two bidders receive permits. All the winning bidders then pay the same price: the lowest accepted bid. All but the lowest winning bidder(s) thus pay less than what they actually bid. Milton Friedman (1991) argued that uniform-price auctions encourage people to bid the highest price they are willing to pay because the high bidders do not risk paying a price greater than the lowest accepted bid. Bidding the highest price you are willing to pay does, however, ensure that you will receive a permit if your bid is higher than the lowest accepted bid.

The auction prices for on-street parking will presumably relate to the market price of nearby off-street parking. For example, if residents can rent parking in a nearby garage, that price could put a ceiling on what residents are willing to bid for a permit to park in the alley. Because the monthly rents in the nearest garages are around \$80 a month, this seems a reasonable estimate for the auction value of the 52 parking spaces in 7th Alley.

The difference between each winner's bid (the price the bidder was willing to pay) and the market-clearing price (the price the bidder does pay) measures the consumer surplus each bidder receives from the purchase (Krugman and Wells 2009, 96). For example, if a resident bids \$90 a month for a permit but pays only \$80 a month, that resident receives a consumer surplus of \$10 a month from the purchase. With a uniform-price auction, the worst that can happen is paying what you think a parking permit is worth. All the other winning bidders will pay less than what they think the permit is worth.

If the auction price is \$80 a month, the 52 permits will yield annual revenue of about \$50,000 ( $\$80 \times 52$  permits  $\times 12$  months) to pay for public services. Although \$80 a month may seem a lot to charge for a permit to park on the street, car owners will receive guaranteed parking spaces, which are valuable assets where parking had previously



**Figure 7.** Barriers to secure reserved parking spaces.

Source: Anonymous apartment.

been a problem. Because the parking revenue will pay for public services, the combination of guaranteed parking *and* the new public services may entice even car owners to support market-priced parking. All the carless residents will benefit from the new public services and their preferences should also enter into any political decisions about Parking Benefit Districts, especially if a large majority are carless.

Each neighborhood will require a separate auction because the demand for and supply of on-street parking varies by location. Cities that are not equipped to manage these auctions can contract with e-commerce companies such as Alibaba or eBay that specialize in online auctions. Some cities already use eBay to auction items such as used police cars.

The permits can be for either assigned (reserved) or unassigned (random) spaces in the alley. If the spaces are assigned, permit holders can be given the right to erect a temporary barrier when they leave to ensure that their spaces will be available when they return. These temporary barriers are often used to prevent unauthorized use of the assigned spaces at apartment buildings in China (Figure 7). If the spaces are unassigned, the city can give discounts for shorter cars, so that more cars can park in the alley (Shoup 2014b).

When owners are away, they can rent their on-street parking spaces to other drivers. Several websites now match drivers who want to park with owners who have parking spaces to offer—a model known as the sharing economy. Parking Panda, for example, allows owners to list parking spaces for rent and to set both the price and available time. The website shows the location, price, and a photo of each parking space. Drivers reserve and pay for the spaces, and Parking Panda sends the proceeds (minus a 20 percent transaction fee) to the space owners once a month. This resembles Airbnb except that renting an on-street parking space in front of a house is much simpler than renting a bedroom inside the house. A formal web-based market for short-term regularized parking will be much more efficient



**Figure 8.** Temporary barrier to protect an illegal parking space.

Source: Quan Yuan.

than putting physical barriers in illegal parking spaces while drivers are away (Figure 8). The income from the formal market for short-term parking should increase the value of a permit to its holder, and this revenue potential will increase both the permit's auction value and the resulting revenue to pay for local public services.

In effect, Parking Benefit Districts can outsource to markets the responsibility for setting the prices of both monthly parking (through auctions for the permits) and short-term parking (through web-based transactions between permit holders and temporary users) on streets in residential neighborhoods.

### *The Payback Period*

At a price of \$80 per space per month, the potential parking revenue in 7th Alley is about \$50,000 a year, which is double the program's operating cost of \$25,000 a year. Because the net operating revenue is about \$25,000 a year (\$50,000–\$25,000) and the capital cost was about \$62,000, the payback period for the capital investment is 2.5 years ( $\$62,000 \div \$25,000$ ). In this case, the parking revenue should more than cover the operating costs and repay the capital costs of the alley improvements. This result suggests that the program can be self-financing and is replicable in other neighborhoods.

If the parking revenue is less than \$50,000 per year, or if the city does not return all the revenue to the Parking Benefit

**Table 3.** Automobile Ownership in Beijing.

	Beijing	Xicheng District	Xisi 6th Alley	Xisi 7th Alley
Number of households	8,350,000	515,000	229	247
Number of households who own cars	3,510,000	201,000	71	86
Number of households without cars	4,840,000	314,000	158	161
Share of households who own cars	42%	39%	31%	35%
Share of households without cars	58%	61%	69%	65%

Source: 2013 Beijing Statistical Yearbook (Beijing Municipal Statistics Bureau 2013a); 2013 Beijing Economic and Social Development Statistical Reports (Beijing Municipal Statistics Bureau 2013b); The Xisi North 6th Alley Community Residents' Committee.

District, the payback period will be longer. In considering the political prospects for priced parking, key questions are what share of the revenue the city returns to the neighborhood and what public services the revenue can finance.

### Political Prospects of Parking Benefit Districts

Parking Benefit Districts resemble conventional Residential Parking Permit Districts except for two key features: Car owners pay the market price for permits and the parking revenue pays to provide public services. Conventional residential permits are usually priced far below the market price of parking because car owners have political influence and resist paying the market price to park in front of their own homes. The political incentives change where most residents do not own a car and the parking revenue pays for neighborhood public services. The residents' desire for public services becomes a countervailing power against the motorists' desire to park free.

To suggest the political feasibility of charging for parking to finance public services, only 35 percent of households in 7th Alley own a car. The carless 65 percent will receive public services without paying anything, and they outnumber the car owners almost 2-to-1. If the carless majority prefers public services to free parking, a Parking Benefit District may be politically feasible.

Car owners benefit from both the public services and the regularized parking, so even they may support a Parking Benefit District. Monkkonen (2012) studied the process of regularizing land for housing in Tijuana, Mexico, and interviewed residents about their willingness to pay for legal titles. The residents strongly supported regularization and legal ownership:

The importance of having an ownership claim was clearly understood. When asked why they wanted to regularise their land, most interviewees responded as if the answer was obvious to the point of being unnecessary. Several replied with the analogy of buying a car. As one woman put it, "If you buy a car, well, you want the papers, right?" (Monkkonen 2012, 298).

Similarly, if you buy a car you want a reliable place to park it, and Parking Benefit Districts can ensure this.

If auctioning license plates is politically feasible, auctioning parking spaces may also be politically feasible if the

revenue directly benefits the priced neighborhood. A parking fee of \$80 a month, for example, amounts to \$960 a year; if the interest rate is 5 percent per year, a level income stream of \$960 per year is equivalent to a capital value of \$19,200 ( $\$960 \div 0.05$ ). In comparison, the prices paid in Shanghai's license-plate auctions have never exceeded \$15,000 (Feng and Qiang 2013). Market prices for on-street parking may therefore raise the price and reduce the growth of car ownership as much as the license-plate auctions.

### Equity in Parking Benefit Districts

At first glance, a lottery that gives every household an equal chance to win a parking space may seem fairer than an auction. A lottery, however, would not provide any revenue to pay for public services. A lottery would instead allot valuable land to a few lucky car owners and nothing to everyone else. Randomly giving free parking to a few car owners, and nothing to the much larger number of people who cannot afford a car, is hardly fair.

If charging for parking can earn \$50,000 a year to pay for public services, free parking subsidizes car ownership by \$50,000 a year. Is providing free parking for 52 cars more important than providing better public services for 247 households? If the city were already charging market prices for parking and spending \$50,000 a year to provide extra public services, few would argue that the city should remove the public services to provide free parking.

Parking Benefit Districts are a bottom-up form of governance, not a top-down form of regulation. But will charging for parking place an unfair burden on lower-income residents? In Beijing, car-owning households have more than twice the income of carless households (Table 4). In 7th Alley, car-owning households have almost three times the income of carless households. Charging for parking and earmarking the revenue for public services will therefore transfer income from richer to poorer households. Because relatively rich households who park their cars on public land will finance local public services, it is hard to argue that charging for parking will be unfair.

We can ask the equity question in another way: Is it fair for drivers to park free on valuable public land? Probably not. Because Beijing's housing is so expensive, almost

**Table 4.** Average Annual Income per Household in Beijing.

	Beijing	Xisi 6th Alley	Xisi 7th Alley
All households	\$13,150	\$9,000	\$9,100
Households who own cars	\$16,600	\$15,300	\$15,600
Households without cars	\$8,000	\$6,200	\$5,600
Income ratio of owners/nonowners	208%	247%	279%

Source: 2013 Beijing Statistical Yearbook; 2013 Beijing Economic and Social Development Statistical Reports; Xicheng District Statistical Information Website; The Xisi North 6th Alley Community Residents' Committee.

one million residents live underground in windowless bomb shelters, which are required by the city's building code. Huang and Yi (2015, 2949) vividly describe the phenomenon:

On the evening of 21 July 2012, Beijing experienced the heaviest rain and flooding in six decades, claiming 79 lives. While some of those who died were migrants living in basements, the heavy rain forced thousands of basement tenants to temporarily live on the street. Overnight, a huge underground population was revealed—a city under the city. Basement tenants are popularly called the “mouse tribe” (or “rat tribe,” *shu zu*) in the media, living in an overcrowded warren of underground tunnels and cellars lacking windows and proper ventilation, all underneath the modern city of Beijing and invisible to the world.

Annette Kim (2014) surveyed this subterranean housing market and found that residents paid an average of \$70 a month to rent housing units that have a median size of 9.75 square meters, or \$7.18 per square meter per month. In comparison, the average on-street parking space is about 15 square meters. If drivers paid the same price per square meter to park on the street as people pay to live underground, the price of parking would be \$108 a month ( $\$7.18 \times 15$ ). An earlier survey in 2012 found that the average living space per underground resident was 5.9 square meters, which is slightly more than one third of the space occupied by a car parked on the street (Huang and Yi 2015, 2960). Nevertheless, car owners park free aboveground while a million people pay to live underground (Figure 9). If drivers can park free on the streets in dense cities that have high land values, a few drivers receive a huge subsidy at the expense of everyone else.

When both equity and efficiency are considered, Parking Benefit Districts should be most appropriate where car owners have higher incomes and most residents do not own a car, so the poorer, carless majority will receive public benefits at no personal cost.

Parking Benefit Districts may be an efficient way to manage on-street parking and a fair way to pay for public services, but do they privatize public land? The government owns the



**Figure 9.** A tiny, windowless, underground room shared by two workers in Beijing.

Source: Sim Chi Yin.

land, charges market prices for parking on it, and spends the revenue to provide public services. Parking Benefit Districts thus resemble market socialism, not privatization.

## Avoiding Corruption and Achieving Efficiency

A recent audit of on-street parking revenue in Beijing found that the city received less than 20 percent of the expected revenue based on its published schedule of on-street parking fees (*China Daily* 2015). This huge discrepancy suggests the scale of corruption or inefficiency possible in parking management.

If all parking revenue goes into a city's general fund, nobody can assess whether the money is being used for its intended purpose or whether public services are being provided efficiently. Dedicating the revenue (also called earmarking, hypothecating, or ring-fencing) to pay for neighborhood public services should limit the opportunities for corruption and inefficiency. Figure 10 illustrates how Parking Benefit Districts fit into a typology of public revenue dedication. Revenue can be dedicated for a specific purpose or place. In the upper left corner of the matrix, income taxes can be spent with no restrictions on purpose or place. In the lower left corner, a gasoline tax is dedicated for a specific purpose, such as transportation, without specifying the place. In the lower right corner, a special assessment is dedicated for a specific purpose in a specific place, such as street lighting or sidewalks on specific blocks. Finally, in the upper right corner, the revenue in a Parking Benefit District is dedicated for a specific place but can be spent on a variety of public purposes. Parking Benefit Districts thus resemble Business Improvement Districts. A major difference is that Business Improvement Districts get their money

		Revenue dedicated to a specific place	
		No	Yes
Revenue dedicated to a specific purpose	No	Income Tax	Parking Benefit District
	Yes	Gasoline Tax	Special Assessment

**Figure 10.** Typology of revenue dedication.  
Source: Donald Shoup.

from taxes while Parking Benefit Districts get their money from private cars parked on public property.

Parking Benefit Districts increase transparency in two ways. First, they are funded by user charges (parking fees) rather than by taxes. Because all car owners pay the same monthly parking fee and the number of parking spaces is fixed, calculating the expected revenue and comparing it with the actual revenue should be easy. A revenue shortfall will quickly reveal inefficiency or corruption. Second, simple rules of thumb, such as the typical revenue and administrative cost per space, can help residents and policymakers evaluate the honesty and efficiency of the district managers. Information about the average cost of maintaining a toilet or cleaning an alley can also help to ensure that residents receive proper value for their money. Comparing the revenues and public services in similar nearby alleys can reveal any anomalies.

To ensure transparency in charging for parking and spending the revenue, cities may need to publish audits for each district. To guarantee fairness and due process, cities can also allow appeals to a hearing officer to adjudicate disputes and complaints in the districts. An appeals process may also reveal systemic flaws in the program that can be corrected. Even where large citywide programs are corrupt and inefficient, the clear incentives and relative transparency in small Parking Benefit Districts could prompt more frugal management.

Parking Benefit Districts cannot eliminate corruption, of course, but corruption is not always an entirely unmitigated evil. In many countries, some corruption may be

needed to grease the gears of government and create a bureaucratic incentive to charge for parking. After all, the only thing worse than a powerful, inefficient, and corrupt bureaucracy may be a powerful, inefficient, and incorruptible bureaucracy.

## Parking Benefit Districts in Other Cities

Parking Benefit Districts would be of little interest if they were appropriate only for hutongs in Beijing, but many other cities have neighborhoods with expensive land, poor public services, and crowded curb parking. Cairo, Lagos, Mumbai, and São Paulo are examples of megacities that have neighborhoods where parking charges could finance public services. Even some neighborhoods in richer cities are good candidates for Parking Benefit Districts. Table 5 shows that only 45 percent of households in New York City own a car, 22 percent in Manhattan own a car, 14 percent in Chinatown own a car, and only 7 percent in Chinatown's Census Tract 29 own a car. The motoring minority are also richer than the carless majority. The average income for Manhattan households who own a car is 88 percent higher than for carless households, so it seems fair to charge Manhattan motorists for parking on public land to pay for public services. In Chinatown and the Lower East Side, car owners have 48 percent higher incomes (Table 6).

Some car owners park off-street, so the share of households who park on the street is lower than the share who own a car. One survey in New York City found that the share of car owners who parked off-street was 35 percent in a neighborhood in Queens and 12 percent in a neighborhood in Brooklyn (Weinberger et al. 2008, 7). Another study in the New York City region found that 65 percent of the households who own a car have off-street parking (Guo 2013, 23). The bottom row in Table 5 thus overstates the share of households who park on the street.

In the heart of Chinatown, Mulberry Street has a density of 130,271 persons per square mile (50,298 persons per square kilometer). In any dense neighborhood with a large number of residents and a small number of on-street parking spaces, only a tiny fraction of the residents park on the street. Because parking is scarce and demand is high, some drivers park illegally. Illegal parking on the sidewalks in Chinatown is common (Transportation Alternatives 2006).

Because the lowest price for off-street parking in Chinatown is \$40 a day (Parkopedia), charging market prices for on-street parking can produce substantial revenue to repair broken sidewalks, plant street trees, install security cameras, or remove the grime from subway stations (Figure 11). Many people will benefit from these public services while few will pay for on-street parking (Shoup 2011, 442–50).

Where land is expensive but on-street parking is cheap, cities give big subsidies to a few drivers who park at the curb.

**Table 5.** Automobile Ownership in New York City.

	New York City	Manhattan	Chinatown	Census Tract 29
Number of households	3,063,393	738,131	18,107	2,144
Number of households without cars	1,699,976	577,967	15,639	1,998
Number of households who own cars	1,363,417	160,164	2,468	146
Share of households who own cars	45%	22%	14%	7%

Source: 2008–2012 American Community Survey 5-Year Estimates. Tract 29 in Manhattan is Census Tract 36061002900.

**Table 6.** Average Annual Income per Household in New York.

	New York City	Manhattan	Chinatown and Lower East Side
All households	\$77,060	\$120,091	\$75,425
Households who own cars	\$96,472	\$191,389	\$104,122
Households without cars	\$61,836	\$101,554	\$70,246
Income ratio of owners/nonowners	156%	188%	148%

Source: 2008–2012 American Community Survey, Public Use Microdata Sample.



**Figure 11.** A subway station at West 4th Street in Manhattan.  
Source: Eric Goldwyn.

Beyond this inequity, drivers waste time and fuel hunting for scarce but free curb spaces. This cruising for parking pollutes the air, congests traffic, and endangers pedestrians and cyclists (Shoup 2011, 273–378). For example, researchers who interviewed drivers stopped at traffic lights in New York found that 28 percent of the drivers on one street in Manhattan and 45 percent of the drivers on a street in Brooklyn were hunting for curb parking (Schaller 2006, 1; Transportation Alternatives 2007, 1). In another study, observers found that cruising for curb parking on 15 blocks in the Upper West Side of Manhattan

created about 366,000 excess vehicle miles travelled and produced 325 tons of CO<sub>2</sub> a year (Transportation Alternatives 2008, 10). Free curb parking in a congested city gives a small, temporary benefit to a few drivers who happen to be lucky on a particular day but creates large social costs for everyone else every day. Charging market prices for on-street parking to create one or two open spaces on every block will end this wasteful cruising (Shoup 2006).

## Power Equalization

Business Improvement Districts already allow businesses to tax themselves to pay for added public services (Houston 2003). Since they were invented in the 1960s, Business Improvement Districts have helped to foster a downtown renaissance in many North American cities. Similarly, Parking Benefit Districts will allow each neighborhood to decide whether to charge for on-street parking and how to spend the resulting revenue. Parking can become another source of revenue for local public services, without raising taxes. This pointillist style of public finance can lead to more rational decisions about both parking policies and public services.

If richer neighborhoods have a higher demand for curb parking, they will earn more revenue than poorer neighborhoods. Suppose, for example, a city's Parking Benefit Districts earn \$1,500 a year per metered space in rich neighborhoods and only \$500 a year in poor neighborhoods. In this case, rich districts would receive three times as much per curb space as poor districts. How can a city avoid this inequality and still keep the local incentive to charge for on-street parking? One option is to return to every Parking Benefit District the average revenue of \$1,000 a year per space to pay for added public services. In public finance, this type of redistribution is called power equalization. All neighborhoods that

charge market prices for their curb parking receive the same revenue per space, and power equalization transfers money from richer to poorer districts while maintaining the incentive for every neighborhood to charge for curb parking. Parking Benefit Districts can equally distribute the value of public land used for on-street parking, while free on-street parking unequally distributes this value as subsidies for car owners.

Cities will need to adopt enabling legislation for Parking Benefit Districts, and designing the governance framework is a key issue (Shoup 2011, 447–50 and 695–96). Parking Benefit Districts include features of both Parking Permit Districts (to manage parking) and Business Improvement Districts (to provide public services). Both are well established in many countries, and combining them to create Parking Benefit Districts can serve an important but neglected niche in the federal system: the neighborhood.

## Conclusion: Turning Problems into Opportunities

Following the ideas of Henry George, China has financed much of its recent urban growth by capturing the increase in value when the land is converted from rural to urban use. This high level of land-based revenue is unique to China and is probably unsustainable even there because it depends on rapid urban growth. Georgist parking policy, however, can capture the land value of streets to provide sustainable public revenue and any city can try it.

Streets belong to the community, and Parking Benefit Districts can monetize on-street parking to pay for community benefits. Our case study of a pilot program in Beijing found that on-street parking can finance important public investments with a payback period of less than three years. Most households do not own a car, and the car-owning households' average income is almost three times that of carless households. Charging for parking to finance public services can therefore transfer income from richer drivers to poorer non-drivers. Rich and poor alike will see the benefits of both regulated parking and better public services. Parking Benefit Districts are most appropriate in dense neighborhoods where (1) on-street parking is crowded, (2) public services are poor, (3) land is expensive, (4) most residents do not own a car, and (5) the residents who do own a car have higher incomes.

Any city can offer a pilot program to charge for on-street parking and use the revenue to finance public services. If residents don't like the results, the city can cancel the program and little will be lost. If residents do like the results, however, the city can offer this self-financing program in other neighborhoods. Because neighborhoods will have money to spend and decisions to make, residents will gain a new voice in governing their communities. Parking Benefit Districts may turn out to be an efficient, fair, and politically feasible way to improve transportation, cities, the economy, and the environment.

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## References

- Bahl, Roy, and Johannes Linn. 2014. *Governing and Financing Cities in the Developing World*. Cambridge, MA: Lincoln Institute of Land Policy.
- Bahl, Roy, Johannes Linn, and Deborah Wetzel. 2013. "Governing and Financing Metropolitan Areas in the Developing World." In *Financing Metropolitan Government in Developing Countries*, edited by Roy Bahl, Johannes Linn, and Deborah Wetzel. Cambridge, MA: Lincoln Institute of Land Policy.
- Barter, Paul. 2011. *Parking Policy in Asian Cities*. Mandaluyong City, Philippines: Asian Development Bank. <http://www.adb.org/publications/parking-policy-asian-cities>.
- Beijing Municipal Government. 2001. "The Procedures for Motor Vehicle Curbside Parking in Beijing." <http://www.jincao.com/fa/law18.12.htm>.
- Beijing Municipal Government. 2007. "The Procedures for Road Traffic Management and Infrastructure." [http://news.xinhuanet.com/newscenter/2007-09/04/content\\_6658152.htm](http://news.xinhuanet.com/newscenter/2007-09/04/content_6658152.htm).
- Beijing Municipal Statistics Bureau. 2013a. *Beijing Statistical Yearbook 2013*. Beijing: China Statistics Press.
- Beijing Municipal Statistics Bureau. 2013b. *2013 Beijing Economic and Social Development Statistical Report*. <http://www.tjcn.org/tjgb/201409/27456.html>.
- Bergère, Marie-Claire. 1998. *Sun Yat-sen*. Stanford: Stanford University Press.
- Blaug, Mark, ed. 1992. *Henry George (1839-1897)*. London: Edward Elgar.
- Borrero Ochoa, Oscar. 2011. "Betterment Levy in Colombia: Relevance, Procedures, and Social Acceptability." *Land Lines*, April, pp. 14–19.
- Centre for Science and Environment. 2009. *Choc-a-Block: Parking Measures to Address Mobility Crisis*. New Delhi: Centre for Science and Environment. <http://www.cseindia.org/node/100>.

- Chatman, Daniel, and Michael Manville. 2014. "Theory versus Implementation in Congestion-Priced Parking: An Evaluation of SFpark, 2011–2012." *Research in Transportation Economics* 44:52–60.
- China Daily. 2004. "'Toilet' Drama Flush with Humor." July 8, 2004. [http://www.chinadaily.com.cn/english/doc/2004-07/08/content\\_346564.htm](http://www.chinadaily.com.cn/english/doc/2004-07/08/content_346564.htm).
- China Daily. 2012a. "Residents Fret over Shanghai's Toilets." February 6, 2012. <http://english.peopledaily.com.cn/90882/7720775.html>.
- China Daily. 2012b. "Answer Call for Cleanliness." May 28, 2012. [http://usa.chinadaily.com.cn/opinion/2012-05/28/content\\_1539066.htm](http://usa.chinadaily.com.cn/opinion/2012-05/28/content_1539066.htm).
- China Daily. 2015. "Parking Fees Short in Beijing." January 6, 2015. [http://www.chinadaily.com.cn/china/2015-01/06/content\\_19246419.htm](http://www.chinadaily.com.cn/china/2015-01/06/content_19246419.htm).
- Dales, John Harkness. 2002. *Pollution, Property and Prices*. Northampton, MA: Edward Elgar.
- Dickerson, Marla. 2004. "Mexico's Economy Is Vrooming." *Los Angeles Times*, December 26. <http://articles.latimes.com/2004/dec/26/business/fi-mexcars26>.
- Doebele, William. 1998. "The Recovery of 'Socially Created' Land Values in Colombia." *Land Lines*, April, 5–7.
- Feng, Suwei, and Li Qiang. 2013. "Car Ownership Control in Chinese Mega Cities: Shanghai, Beijing and Guangzhou." *Journeys*, January, 40–49. [http://app.lta.gov.sg/ltaacademy/doc/13Sep040-Feng\\_CarOwnershipControl.pdf](http://app.lta.gov.sg/ltaacademy/doc/13Sep040-Feng_CarOwnershipControl.pdf).
- Friedman, Milton. 1991. "How to Sell Government Securities." *Wall Street Journal*, August 28. <https://dl.dropboxusercontent.com/u/35546513/HowToSellGovernmentSecurities.pdf>.
- George, Henry. 1992 (1879). *Progress and Poverty*. Cambridge, MA: Lincoln Institute of Land Policy.
- Guo, Zhan. 2013. "Does Residential Parking Supply Affect Household Car Ownership? The Case of New York City." *Journal of Transport Geography* 26:8–28.
- Houston, Laurence. 2003. *Business Improvement Districts*. Washington, DC: Urban Land Institute.
- Huang, Youquin, and Chengdong Yi. 2015. "Invisible Migrant Enclaves in Chinese Cities: Underground Living in Beijing, China." *Urban Studies* 52 (15): 2948–73.
- Institute for Transportation and Development Policy. 2015. *Beijing Parking Guidebook*. New York: Institute for Transportation and Development Policy. <http://s3.itdp-china.org/beijing/Beijing+parking+1-Mar-2015+ITDP-China.pdf>.
- Jaffe, Eric. 2015. "Soon You'll Need a Parking Spot before You Can Buy a Car in Beijing." *CityLab*, June 1, 2015. <http://www.citylab.com/commute/2015/06/soon-youll-need-a-parking-spot-before-you-can-buy-a-car-in-beijing/394562/>.
- Kim, Annette M. 2014. "Hidden City: Beijing's Subterranean Housing Market." *Land Lines*, October, 2–7. [https://www.lincolninstitute.org/pubs/2466\\_Hidden-City-Beijing-s-Subterranean-Housing-Market](https://www.lincolninstitute.org/pubs/2466_Hidden-City-Beijing-s-Subterranean-Housing-Market).
- Kolozsvari, Douglas, and Donald Shoup. 2003. "Turning Small Change into Big Changes." *Access* 23 (Fall): 2–7.
- Krugman, Paul, and Robin Wells. 2009. *Microeconomics*. New York: Worth.
- Lewis, Fred. 2010. "UH May Score Big Bucks in Stadium Parking Auction." *Honolulu Advertiser*, May 22. <http://the.honoluluadvertiser.com/article/2010/May/22/In/hawaii5220335.html>.
- Lin, George, and Amy Zhang. 2015. "Emerging Spaces of Neoliberal Urbanism in China: Land Commodification, Municipal Finance and Local Economic Growth in Prefecture-Level Cities." *Urban Studies* 52 (15): 2774–98.
- Malvey, Paul, and Christine Archibald. 1998. "Uniform-Price Auctions: Update of the Treasury Experience." *Office of Market Finance, United States Treasury*. <http://ipv6.treasury.gov/resource-center/fin-mkts/Documents/upas2.pdf>.
- Monkkonen, Paavo. 2012. "The Demand for Land Regularisation: Theory and Evidence from Tijuana, Mexico." *Urban Studies* 49 (2): 271–88.
- Pierce, Gregory, and Donald Shoup. 2013. "Getting the Prices Right: An Evaluation of Pricing Parking by Demand in San Francisco." *Journal of the American Planning Association* 79:67–81.
- Ríos, Ramiro Alberto, Vera Lucia Vicentini, and Rafael Acevedo-Daunas. 2013. *Parking and Travel Demand Management Policies in Latin America*. Washington, DC: Inter-American Development Bank. [https://www.itdp.org/wp-content/uploads/2014/07/Practical\\_Guidebook-\\_Parking\\_and\\_Travel\\_Demand\\_Management\\_Policies\\_in\\_Latin\\_America.pdf](https://www.itdp.org/wp-content/uploads/2014/07/Practical_Guidebook-_Parking_and_Travel_Demand_Management_Policies_in_Latin_America.pdf).
- Sañudo, Andrés, Xavier Treviño, Jimena Veloz, and Salvador Medina. 2013. *Impacts of the ecoParq Program on Polanco*. Mexico City: Institute for Transportation and Development Policy Mexico. <https://www.itdp.org/impacts-of-the-ecoparq-program-on-polanco/>.
- Schaller, Bruce. 2006. "Curbing Cars: Shopping, Parking, and Pedestrian Space in SoHo." New York, Transportation Alternatives. [http://www.transalt.org/files/news/reports/soho\\_curbing\\_cars.pdf](http://www.transalt.org/files/news/reports/soho_curbing_cars.pdf).
- Shoup, Donald. 1994. "Is Underinvestment in Public Infrastructure an Anomaly?" In *Methodology for Land and Housing Market Analysis*, edited by Gareth Jones and Peter Ward, 236–50. London: UCL Press. <http://shoup.bol.ucla.edu/IsUnderinvestment.pdf>.
- Shoup, Donald. 2006. "Cruising for Parking." *Transport Policy* 13 (6): 479–86.
- Shoup, Donald. 2011. *The High Cost of Free Parking*. Chicago: Planners Press.
- Shoup, Donald. 2014a. "Informal Parking Markets: Turning Problems into Solutions." In *The Informal American City*, edited by Vinit Mukhija and Anastasia Loukaitou-Sideris. Cambridge, MA: MIT Press. <http://shoup.bol.ucla.edu/InformalParking.pdf>.
- Shoup, Donald. 2014b. "Making Parking Meters Popular." *Access* 45 (Fall): 35–37. <http://www.accessmagazine.org/wp-content/uploads/sites/7/2014/12/access45-ALMANACParkingMeters.pdf>.
- Smolka, Martim. 2012. "A New Look at Value Capture in Latin America." *Land Lines*, July, 10–15.
- Transportation Alternatives. 2006. "Uncivil Servants: A Survey of Government Worker Parking Abuse in NYC's Chinatown and Civic Center." New York: Transportation Alternatives. [http://www.transalt.org/files/news/reports/uncivil\\_servants.pdf](http://www.transalt.org/files/news/reports/uncivil_servants.pdf).
- Transportation Alternatives. 2007. "'No Vacancy' Park Slope's Parking Problem and How to Fix It." New York: Transportation Alternatives. <http://www.transalt.org/files/news/reports/novacancy.pdf>.
- Transportation Alternatives. 2008. *Driven to Excess: What Underpriced Curbside Parking Costs the Upper West Side*. New

- York: Transportation Alternatives. [http://www.transalt.org/files/news/reports/driven\\_to\\_excess.pdf](http://www.transalt.org/files/news/reports/driven_to_excess.pdf).
- Trescott, Paul. 1994. "Sun Yat-sen and China: More Than Land Policy Was Involved." *American Journal of Economics and Sociology* 53 (3): 363–75.
- Van Horn, John. 2014. "A Parking Auction at Chapman University." *Parking Today*, August, 20–21. <http://www.parkingtoday.com/articledetails.php?id=1697>
- Wang, Rui, and Quan Yuan. 2013. "Parking Practices and Policies under Rapid Motorization: The Case of China." *Transport Policy* 30:109–16.
- Weinberger, Rachel, Mark Seaman, Carolyn Johnson, and John Kaehny. 2008. "Guaranteed Parking—Guaranteed Driving." New York: Transportation Alternatives. [http://www.transalt.org/files/news/reports/guaranteed\\_parking.pdf](http://www.transalt.org/files/news/reports/guaranteed_parking.pdf).
- Yang, Lan. 2016. "Shanghai Residents Want More Cars Despite Its Parking Wars." *Global Times*, January 13, 2016. <http://www.globaltimes.cn/content/963391.shtml>.
- Yang, Zan, Rongrong Ren, Hongyu Liu, and Huan Zhang. 2015. "Land Leasing and Local Government Behaviour in China: Evidence from Beijing." *Urban Studies* 52 (5): 841–56.

- Zhao, Yanjing, and Chris Webster. 2011. "Land Dispossession and Enrichment in China's Suburban Villages." *Urban Studies* 48 (3): 529–51.

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