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The Price Doesn't Matter If You Don't Have to Pay: Legal Exemptions and Market-Priced Parking

Michael Manville[1] and Jonathan A. Williams[2]

Abstract

Congestion pricing is an effective way to combat congestion, and market prices for curb parking are an appealing way to implement pricing, because paying to park is more politically acceptable than paying to drive. But pricing is effective only if users have to pay, and market-priced parking is vulnerable to nonpayment. To illustrate this problem, we survey parking meters in Los Angeles. We focus on *legal* nonpayment, and show that almost 40 percent of vehicles at meters are both not paying and not breaking any laws. The majority of nonpayment comes from vehicles displaying disabled credentials. These credentials undermine the effectiveness of priced parking and appear to invite substantial fraud.

Keywords

parking, transportation, congestion, congestion pricing, public finance, disability

Introduction

Transportation analysts often recommend pricing to combat road congestion and its attendant externalities, such as lost time, air pollution, and carbon emissions (Arnott 2005; Shoup 2005). Pricing motor vehicle travel, however, is logistically complicated and politically difficult. Hence pricing, while almost universally endorsed by academics, remains rare in practice (Levinson and Odlyczko 2008). Obstacles to congestion pricing include resistance from drivers, concerns about equity, and mistrust between government agencies (King et al. 2007; Schaller 2010). While these obstacles are substantial, most scholars assume that once pricing is implemented it will be effective, and that its effectiveness will bolster its popularity. Some evidence supports this idea: road congestion pricing in both London and Stockholm significantly reduced traffic congestion, and pricing was more popular after implementation than before it (Santos 2008; Harsman and Quigley 2010).

Researchers have for the most part neglected the possibility that pricing, once implemented, will *not* be effective. Pricing, however, could fail. The effectiveness of congestion pricing rests heavily on the assumption that users must pay the charge or not use the road. If that assumption doesn't hold—if many drivers can avoid payment yet still drive—the benefits of pricing will fall.

Our concern in this article is that a new emphasis on market-priced parking, as opposed to congestion-priced driving, might exacerbate the problem of nonpayment. Market-priced parking is both logistically and politically more feasible than directly charging people to drive, but priced parking in many cities suffers from old technology, poor enforcement, and—in particular—both formal rules and informal norms that allow drivers to evade payment without fear of punishment. We focus on the city of Los Angeles to examine the nonpayment problem, for two reasons. First, the LA urbanized area is the most traffic-congested region in the United States, so any policy reform designed to reduce congestion—and any obstacle to such a reform—is particularly relevant in Los Angeles. Second, the city of Los Angeles is a good example of the hope placed in market-priced curb parking. The City, in partnership with the federal government, is currently embarking on an $18 million pilot project in downtown LA to test the efficacy of market-priced street parking. The federal government is in a similar partnership with the city of San Francisco. Nonpayment, if sufficiently pervasive, could undermine the validity of these experiments, and unduly dilute enthusiasm for performance-priced parking.

We examine four types of nonpayment: scofflaws who park without paying, failed meters, the use of government credentials, and—in particular—the use of disabled credentials,

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which in California and many other states allow drivers to park free for unlimited time. The latter three types of nonpayment are notable for being *legal.* We find that legal nonpayment is widespread, and that fully half of all vehicles that occupy spaces without paying do so by displaying disabled credentials, and particularly disabled placards (disabled license plates were far less common). This use of placards results in low turnover at parking spaces and large amounts of lost revenue for the city of Los Angeles.

The next section of this article outlines the advantages of market-priced parking. The third section discusses nonpayment in more detail, and the fourth section presents our research strategy. Then we present our results. In the final section we offer policy recommendations, the most important of which is to end the payment exemption for disabled placards. As part of this discussion, we confront the inevitable question of whether many placard users are committing fraud. Answering that question conclusively is beyond the scope of this article. There is reason to believe fraud is widespread, but neither our analysis nor our argument for eliminating the exemption depend on fraud being pervasive. We present information from 2000 Census microdata suggesting that disabled payment exemptions are poorly targeted interventions, and that better ways exist to help people with disabilities.

The Logic of Priced Parking

The classic form of congestion pricing is dynamic road tolling—road prices that vary with demand, usually by time of day and day of the week. Road tolling is, in economic terms, "first best," or ideal (Arnott 2005), because it directly targets the activity that leads to congestion: driving in times and places where demand for scarce road space is high. "First best" is different from "feasible," however, and road congestion tolls remain rare, largely because of political resistance from elected leaders and the driver-voters they answer to (King et al. 2007).

Market prices for curb parking are an appealing alternative to road congestion pricing for four reasons. First, although charging people to park is not perfectly equivalent to charging them to drive, almost all vehicle trips end in a parking space, so the demand for parking can vary closely with the demand for driving. Thus market-priced parking can be a powerful and effective way to reduce congestion. Second, the *type* of driving that priced parking eliminates is almost entirely socially wasteful. One concern that surrounds road congestion pricing is that priced roads will make it more difficult to engage in productive activities, such as going to work or school. Whatever the merits of this argument, it is less valid when parking, rather than driving, is priced. Market-priced parking eliminates cruising, and drivers cruising for parking are not on their way anywhere; they have already arrived and are simply driving around in an effort to reduce their parking costs.[1] Third, paying directly for parking, while not common, is nevertheless *more* common than paying to drive, and voters are accustomed to it even if they don't like it. Fourth, cities can introduce paid parking incrementally and autonomously. Effectively implementing road congestion pricing can require tolling an entire network, and this can in turn require cooperation across local governments, as well as permission from state and federal agencies. Cities, however, already have the authority to charge for parking, so they can introduce parking charges quickly and do so neighborhood by neighborhood.[2]

These advantages of priced parking have been well elucidated by Shoup (2005) and Verhoef, Nijkamp, and Rietveld (2005), among others. Shoup (2005) suggests that cities set a target occupancy rate of 85 percent for each block side, and adjust the price to maintain that rate. The 85 percent rate ensures that arriving vehicles always have a place to park, which reduces cruising. To gain political approval, Shoup suggests spending the resulting revenue to provide local services in the areas where the meters are located. Note that both the economic and political aspects of this proposal hinge on payment; the economic gains from reduced cruising result from drivers having to pay, as do the political benefits that come from revenue-funded local public services.

The Dilemma of Nonpayment

Figure 1 shows the problem that motivates this article. Taken from sensors placed below parking spaces on a block of Hollywood Boulevard in 2009, the figure shows consistently high occupancy throughout the day—never below 80 percent—but a consistently low level of payment. At just after 1 PM, for example, about 85 percent of parking spaces are occupied. Eighty-five percent is Shoup's (2005) target occupancy rate, but it is doubtful in this case that the occupancy rate has much to do with the parking's price, since fewer than half of the occupied spaces are collecting any money. At both 10 AM and noon there is no vacancy at all, suggesting that prices should be higher. But in both cases, fewer than 50 percent of drivers have paid, suggesting that higher prices might do little to create turnover.

Why might some vehicles not pay? Consider four reasons:

1. *Inadequate enforcement:* A driver might park at a metered spot and gamble she will be done with her business before an enforcement official arrives and cites her. Some drivers might set out to deceive enforcement personnel, for instance by placing an empty citation envelope on the windshield to make it appear they have already been cited. The driver might know an area is poorly policed, or that the fine for nonpayment is small, or that an errand is quick and the probability of being caught is low (Becker 1993). Or people might be willing to pay but have no coins, and no place to find them.

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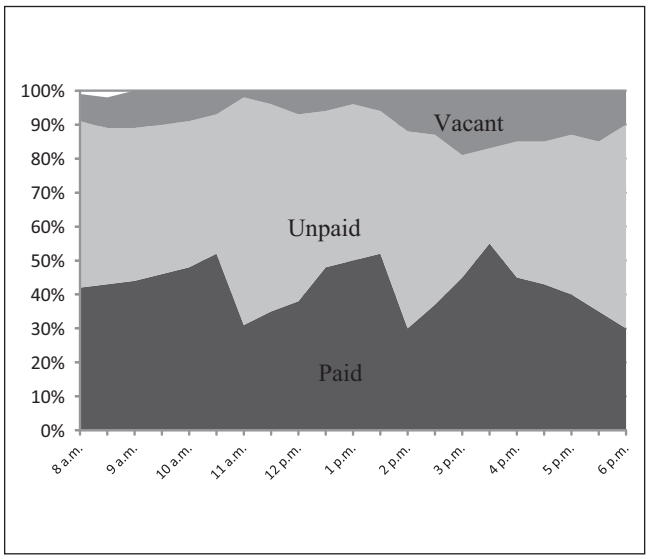

Figure 1. Parking Occupancy and Payment, Hollywood Boulevard 2009 ($1/hour)

2. *Meter failure:* Many cities have older parking meters designed for an era when parking was less expensive, often 10 to 25 cents an hour. If local governments increase meter rates to encourage turnover, which could result in charges of $1 to $4 an hour, the meters can quickly fill up with coins and fail. Older meters are also prone to vandalism. Scofflaws can tamper with old meters by jamming them with paper clips or spraying hardening foam into their coin slots. In many cities, a failed meter is a free meter. In Los Angeles, for example, drivers arriving at a failed coin-only meter park free. These drivers must still abide by any time limits, but time limits in these circumstances are only sometimes enforced. Parking personnel are more attentive to easily noticeable meter violations and less likely to do the extra work involved in chalking tires and noting times of arrival for drivers specifically parked at failed meters.
3. *Government identification:* State and local government officials, including police officers and other civic officials, often have credentials allowing them to park free and without time limits at curbside spaces. In some cities this exemption is a formal rule; in others it is simply common practice. Such provisions are sometimes abused: American diplomats in London consider themselves exempt from the London congestion charge, and refuse to pay tolls (Santos 2008). Similarly, UN diplomats in New York, by dint of their immunity, for years refused to pay New York City parking fines, and in 1996 alone were responsible for more than 160,000 violations. The city later revoked the diplomatic plates of two hundred officials (Fisman and Miquel 2007). And in 2010 New York cracked down on what it called excessive use of government parking permits, revoking 25,000 credentials.
4. *Disabled placards:* In at least 24 states and Washington, D.C., as well as a number of municipalities in other states, vehicles displaying a disabled placard are allowed to park free, and often without time limits. In California, for example, a vehicle with a disabled placard gets free, time-unlimited parking at curbside parking spaces. Table 1 shows states that grant free parking to holders of disabled placards.

Reasons one and two are serious but solvable. If the bulk of nonpayment is the result of inadequate enforcement, local governments can employ more and better policing. Indeed, sensors embedded beneath parking spaces can alert authorities immediately if a space is occupied but not paid for. In addition, illegal nonpayment, while a significant problem, may also be self-limiting. Each illegal parking session is likely to be short, because the probability of detection and punishment rises the longer an unpaid vehicle stays parked. So while parking without paying deprives the local government of revenue, it may not impede turnover and vacancy, and therefore not interfere overly with the efficacy of the pricing system.

Similarly, if meter failure is the source of most nonpayment, the city can upgrade its meters. Newer parking meters rarely malfunction, and when they do they send a signal to centralized controllers, who can dispatch a repair team quickly. Moreover, because new pay station meters are linked to a network, motorists who arrive at these failed meters are not usually allowed to park free, but rather required to pay at another meter, or via cell phone. New meters also accept debit and credit cards, which could reduce illegal parking if some scofflaws park without paying because they lack coins.

The third and fourth reasons for nonpayment, however, are more difficult to address, and can be solved by neither technological improvement nor increased policing. (If a credential is being used fraudulently, policing can help, but detecting fraudulent use of credentials is time-consuming and difficult, as we discuss later).[3] Legal nonpayment may therefore be both more pervasive and a greater impediment to pricing than illegal nonpayment. Disabled credentials are likely a larger problem than government credentials, because disabled placards are easier to acquire. The power to distribute government credentials is relatively centralized,[4] and few people are qualified to hold such credentials. Furthermore, local governments have both the incentive and ability to minimize the use of government credentials at local parking meters, because local revenue will fall as the use of credentials rises.

By contrast, a broad set of conditions qualifies people for permanent or temporary disabled parking credentials, and a wide variety of professionals, most of them not under the

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Table 1. Parking Privileges for Holders of Disabled Placards, by State

State	Benefit	Code
Alaska	Free parking, no time limit	28-10-181; 28-10-495
Arkansas	Discretion of counties and cities	27-15-312
California	Free parking, no time limit	V C Section 22511.5
Connecticut	Free parking, no time limit	14-253 e
Florida	Free parking, no time limit	316.1964
Hawaii	Free parking, 2.5 hours or meter maximum	§291-55
Idaho	Free parking, no time limit	49-410
Illinois	Free parking, no time limit	Sec. 11-1301.1.
Indiana	Free parking, no time limit[a]	IC 9-18-18-2
Kansas	Free parking, 24 hour time limit	8-1, 126
Maryland	Free parking, up to four hours[b]	§13-616
Massachusetts	Free parking, no time limit	Ch40, Sec22; Sec22A
Michigan	Free parking, no time limit	257.675
Minnesota	Free parking, no time limit	169.345
New Hampshire	Free parking, no time limit	265:73
North Dakota	Free parking, no time limit	39-01-15
Oregon	Free parking, no time limit	811.635
Rhode Island	Free parking	§31-28-4
South Carolina	Free parking, no time limit	56-3-1965
Tennessee	Free parking	55-21-105.
Texas	Free parking, no time limit	681.006.
Utah	Free parking, for "reasonable periods of time"	41-1a-414
Vermont	Free parking, no time limit	§304a
Virginia	Free parking, four hour time limit	46.2-1245
Washington	Free parking	46.61.582
Washington, D.C.	Free parking, twice the posted time limit	Ch17,Title 18
Wisconsin	Free parking, no time limit[c]	346.5

Note: The table shows those states where we were able to identify parking privileges for placard holders. It is possible that some of the remaining states, or some municipalities within those states, also offer privileges to placard holders. For instance, to our knowledge New York State does not offer a payment exemption for placard holders. New York City, however, does. People with a city-certified placard may park free without time limits. See New York City Department of Transportation, "Parking Permit for People with Disabilities," http://www.nyc.gov/html/dot/html/permits/nyc-pppd.shtml.
[a]Disabled veterans only.
[b]Vehicles in 30-minute meters excluded.
[c]Applies only if meter space is not ADA compliant.

authority of local governments, can certify that people have these conditions. In California, for example, doctors, midwives, nurse practitioners, optometrists, and chiropractors can all certify that people have impaired mobility or vision, and this certification, when presented to the state Department of Motor Vehicles (DMV), qualifies a person for a disabled placard. In practice, people receive disabled credentials for both long- and short-term conditions, ranging from serious permanent disabilities to sprained ankles and pregnancy. The placard exemption is therefore a state law that imposes local costs; the state grants the exemption (and state lawmakers take credit for delivering an entitlement to a vulnerable group), while local governments lose revenue and the ability to efficiently allocate curb parking spaces.

For municipal officials, placards pose a dilemma. A placard grants free and time-unlimited parking to its holder, so its value rises with the price of parking. In a world where all parking is free and time-unlimited, the value of the disabled placard is low. As the price of parking rises, however, so too does the permit's value. We should therefore see a pattern where more people use permits in the highest-priced areas. This pattern might involve premeditation, as people set out to acquire permits in reaction to high prices, or might be more subtle, as people react to higher prices by using the placard of a friend or relative. Placard use might also increase because people with disabilities are less able to alter their behavior. Where able-bodied people might be able to avoid prices by walking, taking transit, or parking in less-accessible off-street spaces, people with disabilities might find such adjustments more difficult, and continue to use curb spaces even as other drivers substitute away from them. In any event, as the share of exempt vehicles rises, turnover will fall, and the price of parking, if it is responsive, will rise again. This in turn will increase the value of

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the placard, and the cycle will start over. Taken to its logical conclusion, this cycle could eventually result in placard holders completely driving out paying customers. The increased price of parking—designed to create turnover in the most congested areas—would accomplish precisely the opposite.

The logic above yields four hypotheses:

1. *Both illegal and legal nonpayment will be problems in areas with priced parking, but legal nonpayment will be more pervasive*. A person who can avoid prices with impunity will consume more of the priced good. Individuals who park illegally must avoid detection; individuals who park legally without paying face no such constraint.
2. *Drivers with payment-exempting credentials will be more likely to use curb parking, and the share of curb spaces occupied by legally exempt vehicles will rise with the parking's price.* If priced properly, street parking should be a premium amenity. The convenience it affords drivers with quick errands should give it a higher price than off-street parking. However, drivers shielded from the price will be overrepresented at curb spaces, and this overrepresentation will be more prevalent in places where parking is more expensive.
3. *Vehicles with credentials exempting them from payment will park longer than vehicles whose drivers have to pay, and longer than vehicles that park at failed meters.* For people parked illegally, the risk of being cited rises with the duration of the parking session. And a person who parks at a failed meter is likely to stay for a shorter period of time than an individual with a credential for two reasons. First, to the extent it is enforced, the time limit still applies to failed meters. Second, in most cases finding a failed meter is a matter of chance. Because motorists don't know beforehand that they will be able to park free—because they likely set out with an expectation of paying—they may have other destinations to reach. People intending to pay at high-value parking spaces are likely to be in a hurry. A credential, by contrast, grants foreknowledge of nonpayment. A person who knows he need not pay for a premium space can organize his day around remaining parked in it.
4. *Meter failure will account for a substantial share of nonpayment, but not in places where new meters are prevalent.*

Data and Methods

We are not the first to note the prevalence of legal nonpayment in street parking. Anecdotal evidence, as well as data gathered by consulting firms, suggests that disabled placards in particular are pervasive in downtown areas with high-priced parking. A reporter for the *Oakland North* newspaper found that 44 percent of the vehicles parked in downtown Oakland on a random weekday were displaying disabled placards.[5] A 2009 study by Desman Associates examined 380 meters in Los Angeles and found that while only 5 percent of the vehicles parked at meters displayed disabled placards, those 5 percent of vehicles consumed more than 17 percent of the available meter time.[6] Similarly, a study of parking duration near hospitals in downtown Seattle found that more than 40 percent of drivers with placards parked for more than four hours in what were otherwise two-hour zones.[7]

Parking is a function of both space and time. At any given time, parked cars occupy a certain proportion of space, and in any given space a parked car will consume a certain amount of time. To measure both, we conducted two different kinds of surveys. The first, designed to ascertain how many parking spaces are occupied but not paid for at any given time, was cross-sectional. The city of Los Angeles has between 37,000 and 40,000 curb parking meters, which are divided into eighty Parking Meter Zones (PMZs). (Official counts of the city's meters vary substantially, for reasons we can't discern.) The zones are roughly equivalent to the city's neighborhoods and vary widely in size. We selected thirteen of the largest zones and sent researchers, usually in pairs but occasionally alone, to observe parking meters in these zones. The researchers recorded whether a parking space was occupied, whether an occupied meter was paid or unpaid, and, if unpaid, the type of nonpayment observed. The areas we chose had street parking rates ranging from $1 an hour (usually on the west side of Los Angeles) to $4 an hour (in parts of downtown). Almost every space was evaluated both morning and evening, and no surveys were conducted within 30 minutes of a tow-away or no-stopping restriction. Drivers sitting in their vehicles at unpaid meters (and not actively engaged in loading or unloading) were marked as unpaid, in accordance the California vehicle code. We grouped the observations into block sides and also collected data on various block amenities (e.g., whether there was public off-street parking on that block side).

Most of LA's parking meters are older, coin-operated single-space meters. In recent years, however, the city has begun transitioning to new meters, including "IPS" single-space meters that accept credit cards, and multispace meters that allow drivers to pay at any pay station, or via mobile phone. The presence of both new and old meters allows us to examine the role that meter age plays in nonpayment, but because pay stations allow drivers to pay remotely, they also introduce potential bias into the survey. Remote payments are registered via wireless connection to a central payment and enforcement system. If a driver parks and pays by phone, the meter station nearest his space classifies his vehicle

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(incorrectly) as unpaid. Similarly, if a driver parks and pays at a pay station blocks away, the station nearest his space would falsely report his vehicle in violation. (Parking enforcement officers avoid wrongly ticketing such vehicles by carrying handheld devices that communicate directly with the central parking system.) Because our surveyors examined only the meter closest to any given space, it is possible we undercounted payment and overcounted illegal nonpayment. However, if it is reasonable to assume that most drivers use the meter closest to their vehicle, then any bias introduced by multispace meters is probably small. As it was, we found relatively few vehicles at multispace meters that were both unpaid and lacked an exempting credential.

The surveys were carried out from March to June 2010. In total, we assembled 11,322 observations of 4,933 unique meters on more than 500 unique block sides (a block side is one side of a city block). The survey thus covered approximately 12 to 13 percent of the city's meters. Table 2 shows the locations and counts of our surveys; Appendix A shows these locations on a map.

The second type of survey, designed to ascertain how much *time* vehicles consumed, were continuous observation surveys. In these surveys, a research team observed one block side of meters for the duration of the metering period,[8] usually between eight and ten hours. The surveyors observed all parking activity for that duration, recording the start and end time of every parking session; the time and length of payment; and any visible reason for nonpayment. We conducted five such surveys: Table 3 shows the times, locations, meter type, and meter rate.

Results

The cross-sectional surveys tested the ideas that legal nonpayment would be more pervasive than illegal nonpayment, that the use of disabled placards would increase with parking meter rates, and that new meters would mitigate meter failure problems.

Table 4 shows our results. Across all surveyed neighborhoods, we observed 61 percent meter occupancy, which in the absence of any distortions would suggest that prices in many places are too high (assuming target occupancy is 85 percent). Of the occupied spaces, however, less than half (48 percent) were paid, ranging from a high of 70 percent along Santa Monica Boulevard to a low of 30 percent in the Civic Center area of downtown Los Angeles. This low level of payment is a significant distortion, and suggests that if more vehicles had to pay, the price of parking could be lower. Payment correlates inversely with the share of meters where disabled placards were observed, and also correlates inversely with the presence of vehicles that simply failed to pay ("Percentage Expired"). Disabled placards were observed at 27 percent of all occupied meters, while illegal nonpayment was observed at 13 percent. In total, legal nonpayment accounted for 40 percent of occupied spaces.

The final four columns of Table 4 examine reasons for nonpayment. Government credentials are an issue but a minor one, accounting for 6 percent of nonpayment overall and never climbing higher than 14 percent in any neighborhood.[9] Meter failure is a substantial problem, accounting for 19 percent of overall nonpayment and nearly half of nonpayment in some neighborhoods. As the table's final column shows, however, meter failure drops sharply as the share of newer, computerized meters rises.

The most important contrast is between illegal nonpayment and the use of disabled placards. Overall, disabled placards account for 50 percent of all nonpayment, twice the share accounted for by meter scofflaws who illegally park without paying. Moreover, our research method probably understates the placard problem, because approximately 5 percent of the disabled placards we observed were at spaces with time on the meter. While we marked these "paid," it is reasonable to assume that most of these drivers had not deposited money, but had pulled into spaces where the previous occupant had time remaining. (As an aside, there is ample room to improve the illegal nonpayment problem: only 6 percent of the illegally parked vehicles had citations.)

Is the prevalence of disabled placards related to the price of parking? Placards are most common in Civic Center, where parking can be $4 an hour. Placard use is also high in Westwood Village, however, where parking is only $1 an hour. We estimated three regressions relating the fraction of placard-displaying vehicles on a block side to the block side's meter rate. This is an imperfect exercise for four reasons: individual vehicles would be better units of analysis, proportional dependent variables can be troublesome, and the prevalence of disabled placards is doubtless influenced by other attributes (the presence of older people travelling to an area, or the presence of medical facilities) for which we don't have measurements. Lastly, only about 10 percent of the block sides we surveyed had parking prices above $2 an hour, so the data may lack sufficient variance to capture the effect of meter rates, particularly if—as seems sensible—that effect becomes more pronounced as parking becomes more expensive. The results are therefore suggestive at best.

Nevertheless, in two of the three regressions the meter rate appears to be a statistically significant predictor of the share of occupied spaces where the vehicle is displaying a placard. In regressions with more controls for time and place, however, the coefficient gets smaller and loses statistical significance. More observations, and particularly more observations of higher priced parking, might give the results more stability. But for the moment the idea that the price of parking influences the incidence of placard use remains plausible but far from definite. A fourth regression, however, does show a strong relationship—even in the presence of many controls—between the presence of new parking meters and a lower level of meter failure. This regression suggests that a 1 percentage point increase in the share of new meters

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Table 2. Parking Meter Observations by Areas Surveyed

Neighborhood	Single-Space Meter Observations	Multispace Meter Observations	Total Meter Observations	Unique Spaces	Meter Rate ($/hr)	Block Side Observations
Beverly–Fairfax	676	0	676	341	1.00	148
Brentwood	328	0	328	167	1.00	30
Chinatown	712	0	712	359	2.00	96
Civic Center	627	508	1,135	304	1-4.00	145
Hollywood	1,202	227	1,429	753	1-2.00	215
Little Tokyo	1,794	0	1,794	407	1-3.00	216
Santa Monica Western	169	236	405	201	1.00	18
Sawtelle	1,075	0	1,075	531	1.00	188
Silver Lake	494	108	602	304	1.00	64
Studio City	280	144	424	424	1-1.50	30
Venice	477	440	917	225	1-2.00	104
Westwood Boulevard	384	586	970	494	1.00	124
Westwood Village	588	267	855	423	1.00	106
Total	8,806	2,516	11,322	4,933		1,484

Note: Meter rates can vary within neighborhoods. Across the entire sample, 48 percent of the observations were at $1 meters, 41 percent at $2 meters, 7 percent at $3 meters, and 3 percent at $4 meters. The final 1 percent were at $1.50 meters.

Table 3. Location and Time of Continuous Observation Surveys

	Date	Meters	Meter Survey Hours	Meter Type	Meter Rate ($/Hr)	Time Limit
Flower Street, Downtown Los Angeles	08 March 2010	14	8 am–6:30 pm	Pay Station	4.00	2 hours
Hope Street, Downtown Los Angeles	25 March 2010	11	8 am–6:00 pm	Conventional	4.00	2 hours
Weyburn Avenue, Westwood Village	07 April 2010	10	8 am–6:00 pm	Conventional	1.00	2 hours/15 minutes[a]
Fashion District, Downtown Los Angeles	29 June 2010	9	8 am–6:00 pm	Pay Station	3.00	1 hour
Little Tokyo, Downtown Los Angeles	16 June 2010	10	8 am–6:00 pm	IPS	2.00	2 hours

Note: IPS = single-space computerized meters that accept credit and debit cards.
[a]Eight meters had a 2-hour time limit; two meters had a 15-minute time limit.

is associated with a 0.2 percentage point decrease in meter failure. All four regressions have rather limited explanatory power, so we present them in Appendix B.

Continuous Observation Surveys

We hypothesized that exempt vehicles would park for longer durations than vehicles subject to prices, and that the share of time consumed by vehicles with credentials (as opposed to the share of *space* consumed, which we just measured) would rise with meter rates. Our results lend credence to these hypotheses. Table 5 shows the share of time consumed by occupancy for each neighborhood, and overall. In every survey, disabled placards consumed the most unpaid time, and in all observations but one (Little Tokyo) they consumed the most *occupied* time. Even on Hope Street—which was an outlier in that eight of its eleven meters were broken on the day of the survey—disabled placards accounted for the largest share of meter time.

Setting Hope Street aside, the disabled share varies positively with meter rate; disabled placards consumed an astonishing 81 percent of the meter time on Flower Street, where the rate was $4 an hour. Note too that, as we hypothesized, the amount of time consumed by illegal parkers was in most cases quite low. In the cross-sectional analysis above, we showed that disabled placards occupied twice as many spaces as illegally parked cars. The continuous observation surveys show that in the Fashion District placard-displaying vehicles consumed almost twice as much time as illegally parked vehicles. In all other survey locations placards consumed between three and eighty times as much time.

These massive differences arise *not* because a large number of drivers use disabled placards. Rather those drivers who use placards stay parked much longer. Table 6 shows the average parking session length for regular (paid or unpaid), disabled, and government vehicles. Because so many of Hope Street's meters had malfunctioned, we examine its working and broken meter spaces separately.

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Table 4. Summary Results of Cross-Sectional Meter Surveys, by Neighborhood and in Total

	All Spaces		Occupied Spaces					Unpaid Spaces				
	Total Meters	Percentage Occupied	Percentage Paid	Percentage Government	Percentage Expired	Percentage Disabled	Percentage Failed	Percentage Government	Percentage Expired	Percentage Disabled	Percentage Failed	Percentage New Meters
Beverly–Fairfax	676	57	33	1	7	30	42	1	11	42	46	0
Brentwood	328	67	58	1	12	31	0	3	29	68	0	100
Chinatown	712	59	37	9	11	35	10	14	18	56	12	0
Civic Center	1,135	75	30	7	15	44	8	10	21	62	7	73
Hollywood	1,429	53	47	2	17	27	12	4	31	49	15	16
Little Tokyo	1,794	61	57	4	13	22	6	8	30	50	12	57
Santa Monica Western	405	89	70	1	12	18	1	2	40	56	2	58
Sawtelle	1,075	48	38	5	11	32	21	8	18	51	23	0
Silver Lake	602	43	39	1	19	12	33	2	31	18	49	18
Studio City	424	60	64	0	14	13	11	0	38	36	26	34
Venice	917	67	62	1	17	19	2	1	46	48	4	48
Westwood Boulevard	970	48	37	1	14	28	27	1	22	43	33	60
Westwood Village	855	86	51	3	9	29	16	6	19	53	22	31
Total	11,322	61	47	3	13	27	13	6	25	50	19	37

Note: "New Meters" refers to either multispace pay stations or computerized single-space (IPS) parking meters. In some cases occupied categories overlapped; i.e., a vehicle with a disabled placard was parked at a failed meter, or a vehicle had a disabled placard but had also paid. When tabulating occupied spaces we count overlapping categories separately, and as a result the columns can sum to more than 100 percent. In examining unpiad spaces, we do not double-count, and ascribe any overpayment to credentials, on the logic that a person with a credential at a failed meter would not have paid even if the meter was working. These columns thus sum to 100 percent, except for rounding.

Table 5. Percentage of Time Consumed by Type of Occupancy and Neighborhood

	Occupied	Paid	Disabled	Government	Expired	Failed	Rate ($)
Flower Street	95	8	81	4	1	0	4.00
Hope Street	66	3	25	9	6	23	4.00
Fashion District	91	21	38	10	22	0	3.00
Little Tokyo	94	43	28	21	2	0	2.00
Weyburn	90	62	21	0	7	0	1.00

Source: Authors' calculations.

Table 6. Length of Parking Session by Type of Occupancy (Minutes)

	Regular			Disabled Placard			Government			
Area	Total Sessions	Average Sessions	Longest Session	Total Sessions	Average Sessions	Longest Session	Total Sessions	Average Sessions	Longest Session	Disabled Percentage of Sessions
Flower Street	56	21	159	19	383	621	1	2	2	25
Hope Street										
Operating	25	26	184	3	173	426	1	94	94	75
Failed	70	20	93	6	195	505	6	79	163	16
All	95	22	184	9	188	505	7	81	163	10
Little Tokyo	70	47	175	8	247	614	11	140	175	7
Weyburn	128	38	181	13	117	549	0	0	0	16
Fashion District	80	28	600	14	138	600	3	181	517	10
Total	429	32	600	63	229	621	22	121	517	74

Note: "Total sessions" are absolute number of sessions, not minutes. Regular sessions include any sessions, paid or unpaid, without exempting credentials. Due to high levels of meter failure on Hope Street, operable and inoperable meters are examined separately. Numbers in final column are percentages, not minutes.

Overall, disabled placards account for only 12 percent of all parking sessions, and never exceed 25 percent in any location. But where the average "regular" vehicle parks for 32 minutes, the average vehicle with a disabled placard parks for 229 minutes. (The average vehicle with a government credential parks for 121 minutes.) A number of these averages are biased upward by single extraordinarily long parking sessions, suggesting the potential damage that can be done to priced parking when even one vehicle is exempt from payment.

Table 6 also shows that, as we hypothesized, vehicles parked at failed meters do not stay longer than nonexempt vehicles. For example, the average length of a parking session at a failed meter on Hope Street was 20 minutes—shorter than the average session at a functioning meter (26 minutes), and much shorter than the average session for a vehicle with a disabled placard (188 minutes).

Lost Revenue: Nominal and Effective Meter Rates

The primary value of market-priced parking is to efficiently allocate parking spaces; the social benefits arise from revenue being collected, not being spent. Nevertheless, cities rely on meter revenue to finance public services, and cities collect less revenue when motorists don't pay. Hence examining revenue collection is one way to illustrate the impact of legal nonpayment. Table 7 shows the daily potential and actual daily revenue from each of the areas we continuously observed. "Potential revenue" assumes 85 percent occupancy at current meter rates for all hours of meter operation (the issue of whether the current rates are correct will be discussed shortly). "Actual revenue" is the amount of revenue collected. Because we monitored the meters minute by minute, we are able to account for driver overpayment, and the fact that some vacant spaces generated revenue (i.e., if a driver paid for 15 minutes but left after 10). The nominal meter rate is the posted rate, ranging from $1 to $4 an hour.

Recall from Table 5 that occupancy rates in these surveys ranged from 66 to 95 percent. Table 7 shows that despite such high occupancy, revenue collection was small. Flower Street was 95 percent occupied, but collected less than one-tenth the revenue it should have collected if it was 85 percent occupied. All told, the meters we observed collected between 4 and 77 percent of their potential revenue. In all cases but Hope Street, where vacancy and meter failure were pervasive, the bulk of the lost revenue was a result of legal nonpayment (disabled parking and to a lesser extent government parking). Revenue losses from scofflaws ("unpaid expired")

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Table 7. Daily Potential and Actual Revenue from Observed Parking Meters

Location	Number of Meters	Number of Hours	Nominal Meter Rate ($/hr)	Potential Revenue	Source of Lost Revenue ($)					Actual Revenue ($)	Percentage of Potential	Effective Meter Rate ($/hr)
					Vacancy	Disabled	Government	Expired	Failed			
Flower Street	14	12	4.00	500	32	479	0	9	0	47	9.5	0.28
Hope Street	11	12	4.00	374	153	112	38	29	93	15	4.1	0.14
Little Tokyo	10	12	2.00	204	10	66	45	5	0	114	55.8	0.95
Westwood	10	10	1.00	102	8	25	0	7	0	79	77.1	0.79
Fashion District	9	10	3.00	230	22	102	27	59	0	61	26.4	0.67

Note: Calculations are taken from minute-by-minute observations of parking meters. "Actual revenue" includes revenue from all individual parking sessions, as well as overpayment by individual drivers (vacant spaces collecting revenue). "Potential Revenue" is based on a target of 85 percent paid occupancy throughout the day. As such, columns do not sum to "potential revenue" but rather sum to the total if all parking was always occupied. Dollar figures are rounded off.

were much smaller than losses from legal nonpayment. The meters on Flower and Hope Streets, which have nominal rates of $4 an hour, actually collected an average of 28 and 14 cents an hour, respectively.

Flower Street's meters operate six days a week; in a well-functioning pricing system this single block side would collect $156,000. At the observed rate of payment, however, it would collect less than $15,000. The problem with this calculation, of course, is that it assumes $4 an hour is the correct price for parking on the block side. It may well be that $3, or $5, is the price that yields a consistent 85 percent occupancy rate. But we have no way of knowing the correct price, because so many drivers don't pay. This, again, is the real problem posed by legal nonpayment. The price signal, which is the backbone of all the efficiencies inherent in market-based pricing, is completely obscured.

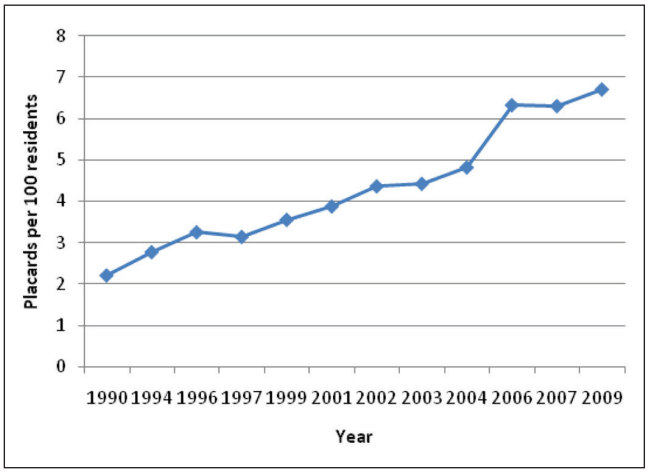

Figure 2. Placard growth in California, 1990-2009

Policy Recommendations and the Problem of Fraud

Anecdotal and journalistic accounts of placard use almost invariably raise the possibility that many placard holders are committing fraud. One could certainly infer, based on available information, that many placards are being used inappropriately. Placard use is growing, and placards are overrepresented at priced curb spaces. Figure 2 shows that between 1990 and 2009 the share of California residents with disabled placards more than tripled, from just more than 2 percent to almost 7 percent. In 2000, the last year for which reliable data are available, 20 percent of the population of Los Angeles County reported some type of disability.[10] Our evidence suggests that on average disabled placards occupied 27 percent of the street parking spaces, and in some high-value areas consumed more than 40 percent of the spaces. We also found suggestive statistical associations between placard use and parking price.

None of this evidence, however, *necessarily* indicates fraud. As the population ages, the prevalence of disability will rise as well, and so too should the use of disabled placards. Likewise, over time more disabled people might take advantage of the placard entitlement, because they become more aware of it, because the price of parking rises, or because newer technologies make it easier for people with disabilities to drive. And the high proportion of disabled placards at curb spaces could simply indicate, as mentioned before, that people with disabilities have fewer alternatives to curb parking.

All that said, considerable evidence suggests placard fraud is rampant. Stakeouts conducted by a local news affiliate in Los Angeles reveal that many placard users have acquired their credentials illegally, either through a black market purchase or (more commonly) by using the placard of an older infirm relative.[11] Our own surveyors repeatedly witnessed what appeared to be fraud.[12] A series of parking stakeouts by police in Alexandria, Virginia, in 2010 found that 90 percent of observed disabled credentials were being used illegally (D'olio 2010). Philadelphia changed its policy toward disabled parking in 2001 after a newspaper exposé about "handi-scammers." British officials claimed in September 2010 that more than half of the nation's 2.5

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million disabled placards were being used fraudulently, and placard fraud also appears to be a salient issue among people with disabilities. A website called handicappedfraud.org tracks what it alleges is improper use of disabled placards. The Christopher and Dana Reeve Foundation released survey results in 2010 showing that "able-bodied people parking in spaces designated for people in wheelchairs . . . was the number one source of daily irritation for people who use wheelchairs."[13]

What can be done about fraud? Fraud is hard to identify, because not all disabilities are readily evident. People who appear able-bodied may nevertheless have serious impairments.[14] Furthermore, some behaviors that seem inappropriate may not actually be illegal. A person using a disabled placard assigned to someone else, or using a temporary placard after it expires, violates the law. But what about a person assigned a placard for a temporary condition—say, a sprained ankle—who uses the credential after the condition has healed but before the placard has expired? For that matter fraud, if present, may occur in a medical office rather than on the street: patients might lie to, or collude with, medical professionals in order to get placards.[15] An infamous case at UCLA illustrates this problem: in 1999, members of the UCLA football team provided false information to doctors and received disabled placards. The players were eventually caught, but detecting impropriety of this sort is difficult, as it might involve wrongdoing by both drivers and medical professionals.

Combating fraud on the street is hard because placards are assigned to people rather than vehicles. Enforcement officers must therefore confront placard users at the moment they arrive or depart. Thus, where catching conventional meter violators becomes easier the longer they stay parked, catching placard frauds becomes *harder*, because the effort consumes so much time. As our continuous observation surveys showed, many placard users stay parked for extremely long periods.[16] Furthermore, on-street enforcement would do little to stem inappropriate behavior by medical professionals, or people who lie to medical professionals. And efforts to regulate placards at the level of the medical professional would almost certainly fail politically and would in any case most likely be counterproductive. State transportation officials have neither the time nor the expertise to determine who does or doesn't have a disability.[17]

In light of these facts, we make two points. First, the incidence of fraud is immaterial to the problem posed by the placards. In 2009 Los Angeles County had about 650,000 valid temporary and permanent placards. The city of Los Angeles constitutes about 40 percent of the population of Los Angeles County. If placards were distributed evenly countywide, 40 percent of these placards would be for residents of LA, meaning the city would have more than six placards for each of its 40,000 parking meters. Given the long duration placard users stay parked, this quantity is more than enough to undermine any attempt at market-priced parking, regardless of whether the placards are legitimate. It is the exemption itself, not abuse of it, that causes the problem.

Second, assuming some fraud exists, the difficulty of enforcement suggests the best option is still to change the law, not pursue individual lawbreakers. Eliminating the payment exemption for placard holders would eliminate the demand for placards by all but those with legitimate disabilities. The time-limit exemption should be left in place, for two reasons. First, people with disabilities may need more time to carry out their tasks. Second, all parking should migrate away from time limits, as binding time limits are *prima facie* evidence that prices are wrong. Eliminating time limits for people with disabilities can be a gateway to eliminating them for everyone.[18]

One objection to removing the payment exemption is that doing so might harm people with disabilities. Fully exploring this question, which depends on both the actual level of fraud and the benefit conferred by the payment exemption, is beyond the scope of this article. Suppose, however, that there is no fraud at all. In that case, removing the payment exemption could harm people with disabilities who are *physically* unable to pay, and those who are *financially* unable to pay. A person physically unable to operate a parking meter is probably severely disabled. Many severely disabled people are either homebound or require assistance when they leave the home (Bureau of Transportation Statistics 2002). For these people, a driver or attendant would presumably be able to operate a meter, just as he or she would also pay for gas, for parking in a private lot, and so on. Thus the law would harm those individuals whose disability is severe enough to preclude operating a meter, but not severe enough to preclude solo driving. While almost certainly some individuals fall into this category, they may not be numerous enough to justify free parking for all placard holders.

Similarly, requiring holders of disabled placards to pay for parking would harm those placard holders too poor to pay for parking but not so poor that they lack access to a vehicle. This group, again, may not be large enough to warrant a blanket payment exemption. More broadly, justifying a payment exemption to all people with disabilities because some people with disabilities are poor requires that three conditions be satisfied. First, there must be evidence that the disability is a cause rather than a mere correlate of the poverty, and second, evidence that poor people with disabilities deserve income support that able-bodied poor people do not. Third, there must be no better way to target benefits toward disabled people with low incomes.

The first two conditions are relatively easy to meet. The causality between poverty and disability runs in two directions, but there is little question that disability increases the odds of being poor (Brault 2005; Lustig and Strauser 2007; Fremstad 2009; She and Livermore 2009). Disability can reduce earnings because it physically precludes employment,

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Table 8. Selected Transportation and Economic Characteristics of People With and Without Disabilities, United States and Los Angeles County (Percentage)

	United States	Los Angeles
Share of people with disabilities in household with vehicle available	80	79
Share of able-bodied in household with vehicle available	92	90
Share of people with disabilities in poverty	21	23
Share of able-bodied people in poverty	13	19
Share of poor people with disabilities who have vehicle available	49	54
Share of poor people with disabilities who commute by automobile	11	12
Share of poor people who have both a disability and a vehicle available	14	12
Share of people with disabilities who have a vehicle available and are poor	13	16
N	14,076,739	471,162

Source: 2000 U.S. Census PUMS 5-percent sample. Calculations for United States are probability-weighted. Calculations for Los Angeles County are unweighted.

because people with disabilities suffer labor market discrimination, or because medical expenses lead to bankruptcy. Conversely, being poor can increase the odds of disability, if stress and poor nutrition lead to deteriorating health, and if insufficient medical care causes minor conditions to become debilitating. And there is some reason to believe that poor people with disabilities warrant more income support than poor able-bodied people. Disabilities, as Sen (2009, 254) notes, "make it harder to convert income into capability." An able-bodied person may be able to do more with a given dollar than a person with a disability.

The third condition, however, is troublesome. Most people with disabilities aren't poor, and most poor people don't have disabilities. Not all people with disabilities have placards, and not all people with placards have disabilities (some, again, have sprained ankles). A parking payment exemption is therefore both over- and under-inclusive. Table 8 presents tabulations from 2000 Census Public Use Microdata (PUMS) that make these relationships more explicit. About 80 percent of people with disabilities live in a household with at least one vehicle available, compared with 90 percent of able-bodied people. Just over 20 percent of people with disabilities are poor, compared with 13 percent of the able-bodied. However, only half of those who have a disability *and* are poor have access to a vehicle, and only about 10 percent rely on a private vehicle to get to work. Perhaps more importantly, only about 13 percent of car owners with a disability are poor, and only 14 percent of the poor have both a disability and access to a vehicle.

The payment exemption therefore offers little benefit to those with the most serious disabilities (who are homebound or cannot use automobiles) and delivers an unnecessary benefit to the majority of people with disabilities who aren't poor. The exemption also provides no benefits to the poorest people with disabilities (who likely do not own vehicles) and no benefit to the majority of the poor who are able-bodied.

Hence even assuming a complete absence of fraud, a law exempting placard holders from payment appears to offer legitimate benefits to only a small group, and that group does not include the worst-off. These benefits, while real, need to be weighed against the exemption's costs. The exemption substantially impedes efforts to fight congestion and localized air pollution (whose burden often falls disproportionately on the poor),[19] and to raise revenue. There is no clear rationale for allowing people with disabilities to impede vehicular turnover and impose pollution and congestion on others, or to impose costs on those who would benefit from public services financed by meter revenue. Indeed, if market-priced parking ensures the continuous availability of one or two spaces on every block, the placard exemption could harm drivers with disabilities who need parking spaces close to their destination.

Politically, one approach might be to remove the payment exemption and dedicate some of the increased revenue to programs that improve access for people with disabilities. These programs could include better paratransit service, more curb cuts, or repairs that bring sidewalks into compliance with the Americans with Disabilities Act—allowing all people, but especially people with disabilities—to move around more easily (Shoup 2010). And if fraud is prevalent, many of these improvements would be financed by erstwhile cheaters, resulting in a transfer of income from able-bodied frauds to people with disabilities.

Conclusion

Pricing is a powerful tool to allocate resources and influence behavior, but its power depends crucially on users' having to pay. This article documents a potential problem with the implementation of market-priced parking: the ease with which many drivers can avoid payment. Some nonpayment can be dealt with fairly easily. Broken meters can be replaced. Illegal nonpayment can be reduced through better enforcement. Furthermore, illegal nonpayment will likely regulate itself to some extent, because people who illegally park without paying will do so for short durations to avoid being caught.

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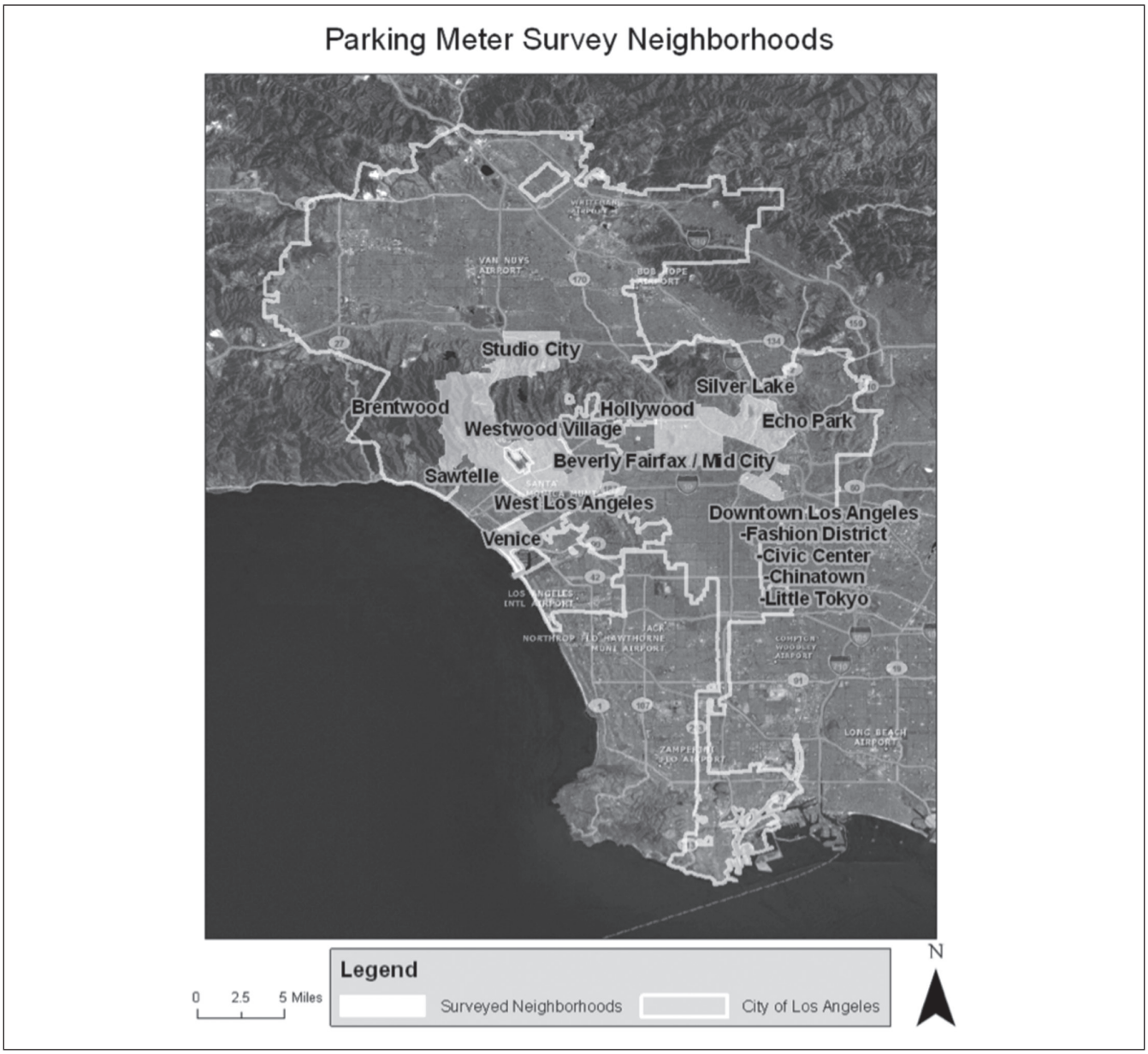
Legal nonpayment, by contrast, is harder to manage, and the fraud that appears to surround it, whatever its magnitude, is difficult to detect. For this reason, states should end the practice of granting free parking to holders of disabled placards. This reform will not be easy. Entitlements are difficult to remove, and undoing an entitlement designed to benefit people with disabilities, in order to more effectively charge drivers to park, is doubtless a tall political order. Federalism compounds this challenge; most of these statutes are state laws that impose local costs. Yet the task is not impossible. Virginia allows cities to opt out of its payment exemption, and in 1998 the city of Arlington did so.[20] Perhaps the best approach to reforming these laws is to focus on the evidence of fraud the laws have engendered. Fraud is not necessary to make the *economic* case against payment exemptions, but it will be useful in making the *political* case for removing them.

Laws that grant free parking to people with disabilities help neither most people with disabilities nor those with the most severe disabilities. These laws also help neither most of the poor nor the poorest. More importantly, the externalities of this clumsy subsidy threaten to undermine a transportation reform that could deliver large benefits to all citizens.

Appendix A

Location of Surveyed Neighborhoods



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Appendix B

Table A1. OLS Estimates: Determinants of Legal Nonpayment

Variable	Percentage of Occupied Spaces with Disabled Placards			Percentage of All Spaces With Meters Failed
	Model 1	Model 2	Model 3	
Parking rate per hour	0.053***	0.039*	0.014	0.002
	(0.01)	(0.02)	(0.04)	(0.02)
Percentage new meters	–0.033	–0.042	–0.044	–0.208***
	(0.02)	(0.02)	(0.02)	(0.01)
Total spaces	–0.002	–0.001	–0.000	0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Number of off-street lots on block side	–0.005	–0.007	–0.011	–0.004
	(0.02)	(0.02)	(0.02)	(0.01)
Constant	0.222***	0.121	0.430	0.008
	(0.02)	(0.08)	(0.23)	(0.16)
Neighborhood fixed effects	No	No	Yes	Yes
Month fixed effects	No	Yes	Yes	Yes
Week of month fixed effects	No	Yes	Yes	Yes
Day of week fixed effects	No	Yes	Yes	Yes
Time of day fixed effects	No	Yes	Yes	Yes
R^2	0.02	0.05	0.07	0.26
N	1,220	1,220	1,220	1,481

Note: "Percentage new meters" is the share of computerized meters, either multispace or IPS (IPS = digital single spaced meters). In the first three models, the dependent variable is the fraction of occupied spaces on a block side where the vehicle displays a disabled placard. The mean of this variable is 0.28 and the standard deviation is 0.29. The sample size is 1,220 because the 264 block sides with no occupied spaces are excluded. In the fourth model, the dependent variable is the fraction of all spaces on a block side that have failed meters. The mean of this variable is 0.14 and the standard deviation is 0.27. Robust standard errors are in parentheses. If the regressions are estimated as generalized linear models with logit links (to account for the dependent variables being proportions) the results are substantively similar: the effect of the meter price on the share disabled loses size and significance with the addition of further controls, while the negative association between new meters and meter failure remains strong. The coefficients of determination are quite low, because a variety of factors we cannot measure probably influence the decision to use a disabled placard (e.g., the share of people who regularly travel in an area who are either elderly or have an elderly relative). For this reason the regression results are best seen only as a check to insure that the observed relationship between price and placard prevalence is not an artifact of broad changes across time and place.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

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Notes

1. Shoup (2006) discusses the incidence and magnitude of cruising. Arnott and Rowse (2009) provide simulation results suggesting that using prices to remove cruising can yield social benefits well above the total meter revenue collected.
2. An additional advantage of market-priced parking is that it could remove the justification for minimum parking requirements (Shoup 2005).
3. The prevalence of legally exempt vehicles could also undermine enforcement of illegal nonpayment. If enforcement officers routinely respond to spaces where sensors indicate nonpayment and find that the vehicles are not in violation, a "crying wolf" problem might arise, where officers become less likely to respond, leading to more scofflaws going unpunished.
4. This was not the case in New York City, where multiple agencies could distribute credentials. The city's major reform has been to consolidate credential distribution. See "City's Parking Permit Problem Worse than Thought," *New York Sun*, March 6, 2008.
5. See "Disabled Placards in Downtown Oakland: Are they Legit?" By Anrica Deb, *Oakland North*, August 20, 2010.
6. Desman Associates, *Financial Analysis and Condition Appraisal: Los Angeles Public Parking System* (Chicago, IL,

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2009). This study only examined "high-turnover" neighborhoods, and as a result may suffer from selection bias. Credentials, after all, are likely to inhibit turnover.

7. Heffron Transportation, "First Hill Neighborhood On-Street Parking Study" (Seattle, WA, 2009).
8. On Flower Street, the survey actually fell one hour short of the full metering period.
9. The two neighborhoods where the government share reaches double digits are those closest to LA City Hall.
10. This information comes from the 2000 US Census, Summary Tape File 3. Evidence on disability is also available from the Survey on Income and Program Participation (SIPP), but not at the county level.
11. See Grover and Goldberg (2010) and Goldberg (2010). In a personal communication, Grover recounts interviewing a downtown merchant who secured four placards when an elderly relative reported her legitimate placard stolen four separate times. The Department of Motor Vehicles sent her a replacement each time; each replacement was distributed to a different employee to give them free parking. Shin (2010) reports that thieves in Washington, D.C., break into cars and steal placards for resale.
12. For example, in two instances seemingly able-bodied office workers parked and paid for 15 minutes of meter time, then entered an office building and returned immediately with placards. They hung the placards for the remainder of the work day. Surveyors also watched a man hang a placard in a van, load a dolly with heavy boxes, and then bounce the dolly down a flight of stairs into a subterranean food court. He remained parked for more than 10 hours.
13. On Britain: http://www.dailymail.co.uk/news/article-1313428/Fraudsters-cost-taxpayers-14-7-million-using-unauthorised-disabled-parking-badges.html. The Reeve Foundation survey is summarized at http://www.prnewswire.com/news-releases/christopher--dana-reeve-foundation-releases-top-10-things-that-annoy-people-who-use-wheelchairs-poll-92978149.html.
14. Shin (2010) reports that the possibility of a difficult-to-observe disability makes police officers in Washington, D.C., reluctant to confront people they suspect of placard fraud.
15. Some journalistic accounts suggest this practice is common. Assemblywoman Joan Quigley, who wrote New Jersey's law granting parking privileges to disabled people, said that in Jersey City, "It became a bit of a scam. It looked like every doctor would write a letter saying this person or that person shouldn't have to walk." See http://blog.nj.com/njv_paul_mulshine/2010/01/handicapped_parking_permits_ne.html. Similarly, in 2004, Barry Siegel of the LA County Disability Commission said, "all people have to do is lie a little bit to their doctor and they can get a placard." See http://www.thefreelibrary.com/DISABLED+LOSING+OUT+ABUSE+OF+PARKING+PLACARDS+HURTING...-a0114762056
16. Two examples: In August 2010 California DMV agents caught eighteen fraudulent placard users in Los Angeles. But the stakeout lasted six hours and involved multiple investigators. See http://www.contracostatimes.com/california/ci_15883262?nclick_check=1. Similarly, a *Seattle Times* profile of an enforcement officer assigned to catch placard frauds (Krishnan 2010) suggests the tremendous labor costs involved. The officer drives an unmarked car, and—because she needs to apprehend violators as they slide behind the wheel—often hides for extended periods of time near vehicles displaying placards. She has tracked some violators for months before being able to cite them.
17. New York City attempts such a program, by choosing the physicians allowed to certify people as disabled. See http://www.nyc.gov/html/dot/html/permits/pppdinfo.shtml.
18. Shoup (2005) discusses how prices can render time limits unnecessary.
19. See i.e. Houston et al. (2004).
20. Section 46.2-1245 of the Code of Virginia.

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