



# Building more parking at major employment centers: Can full-cost recovery parking charges fund TDM programs?



Aldo Tudela Rivadeneyra<sup>a,1</sup>, Manish Shirgaokar<sup>b,2</sup>, Elizabeth Deakin<sup>c,3</sup>, William Riggs<sup>d,\*</sup>

<sup>a</sup> Cambridge Systematics, Inc., 555 12th Street, Suite 1600, Oakland CA, 94607, United States

<sup>b</sup> Urban and Regional Planning Program, Department of Earth & Atmospheric Sciences, University of Alberta, 1-26 Earth Sciences Building, Edmonton, AB T6G 2E3, Canada

<sup>c</sup> Department of City and Regional Planning/Institute of Urban and Regional Development, 316 Wurster Hall, University of California at Berkeley, Berkeley CA 94720-1870, United States

<sup>d</sup> Department of City and Regional Planning, College of Architecture and Environmental Design, California Polytechnic State University, 1 Grand Ave., San Luis Obispo, CA 93405, United States

## ARTICLE INFO

### Article history:

Received 17 February 2016

Accepted 26 October 2016

Available online 31 October 2016

### Keywords:

Parking costs

Parking policy

Pro-forma analysis

Transportation demand management (TDM)

## ABSTRACT

In dense urban areas, surface parking often poses an opportunity cost, and reuse of the land for urban development with parking relocated to a multi-story structure may be an attractive option. This paper analyzes the cost of replacing surface parking with a parking structure and finds that it may be equally cost effective to pursue travel demand management strategies. The paper analyzes what it costs to build a parking space in a multi-story structure (garage) using US average data as well as data from the case of a typical large US employer, the University of California, Berkeley. The Berkeley case illustrates how replacement of surface parking with structures can substantially escalate costs and necessitate price increases for everyone, unless costs can be offset through more efficient utilization rates (e.g., renting out employee parking for evening and weekend use) or the parking system is credited for the land value of former surface parking (not likely in the situation considered here). A transportation demand management (TDM) program offering incentives for other modes of commuting can reduce the need for new parking, and its annual costs are likely to be lower than the amounts needed to cover new parking construction. Parkers could be better off paying for TDM programs to reduce parking demand rather than paying to build new parking structures. The findings are case specific but are likely to resonate with many employers and institutions that provide parking in high-cost urban areas.

© 2016 Published by Elsevier Ltd on behalf of World Conference on Transport Research Society.

## 1. Introduction

In the United States, driving remains the principal means of travel to work, 91% of American commuters use personal vehicles according to the Bureau of Transportation Statistics (Bureau of Transportation Statistics, 2014), and this modal preference is both supported by and reflected in public and private parking policy. In many locations parking is made available in plentiful quantities and provided free or at a subsidy to the user (Shoup, 2005a, 1997). Even in downtowns, parking is often priced at fairly low rates; in a

survey of 107 cities, parking prices averaged \$1 for every two hours for on-street parking and \$11 per day for parking in commuter lots (Auchincloss et al., 2015). In addition, most American workers don't pay for their own parking. This is consistent with older nationwide surveys which found that over 84 million parking spaces are provided for free each day to an estimated 95% of all commuters (Pickrell and Shoup, 1980; Shoup and Pickrell, 1980; Shoup and Breinholt, 1997; Shoup and Willson, 1992).

Nevertheless, a number of cities and some employers have shown increasing interest in more rigorous parking management and pricing that better reflects costs. Several cities have been experimenting with parking pricing reforms carried out as federally funded demonstration projects (Federal Highway Administration, 2015; SFPark, 2014); many others have undertaken purely local efforts to deal with the high costs of parking and the auto use it supports (Guo, 2013b; Kolozsvari and Shoup, 2003).

University campuses are among the employers that have been increasingly focusing on parking issues (Balsas, 2003; Barata et al.,

\* Corresponding author. Tel.: +1 805 756 6317.

E-mail addresses: [atudelarivadeneyra@camsys.com](mailto:atudelarivadeneyra@camsys.com) (A.T. Rivadeneyra), [shirgaokar@ualberta.ca](mailto:shirgaokar@ualberta.ca) (M. Shirgaokar), [edeakin@berkeley.edu](mailto:edeakin@berkeley.edu) (E. Deakin), [wriggs@calpoly.edu](mailto:wriggs@calpoly.edu) (W. Riggs).

<sup>1</sup> Tel.: +1 510 873 8700.

<sup>2</sup> Tel.: +1 780 492 2802.

<sup>3</sup> Tel.: +1 510 469 8922.

2011). This interest is often based on cost control, specifically a desire to balance the costs of parking construction, operation and maintenance against a perceived need to provide parking to employees (and students, clients, and visitors) as a benefit and a business necessity. In some cases, university campuses are rethinking their parking policies because they have an interest in using surface parking lots as building sites, an activity of great relevance in urban centers facing increased development pressure and land scarcity (McCahill et al., 2014). But removal of surface parking is a step that requires either parking replacement, often in higher-cost structures, or demand reduction. The latter option, demand management, has been the subject of some research, but has proven to be difficult to implement (Riggs, 2014, 2015; Riggs and Kuo, 2014). Parking pricing has been found to be an important element of demand management, but it is not always readily accepted by employees, some of whom view affordable (inexpensive) parking as indispensable (Shoup, 2005a).

This paper presents an analysis of parking costs versus price in these circumstances, i.e., where to free up land for other uses, surface parking must be replaced by costlier structured parking unless demand reductions can be achieved. The paper begins with a brief review of the literature relevant to the study. It then presents an example analysis of what it costs to build a parking space in a commercial structure (garage) using US average data and a range of urban land prices. A case study of the University of California, Berkeley's parking dilemma is then presented and used to illustrate how replacement of surface parking with structures can substantially escalate costs, but may also open up opportunities to consider demand management alternatives. The final section discusses implications and recommendations for parking providers who may find themselves in similar situations.

## 2. Literature review

Researchers have been studying the effect of parking on urban transportation and travel behavior since the problems of car usage started to be researched in the 1950's. William Vickrey's work on dynamic pricing for on-street parking (Vickrey, 1954) initiated a discussion on the relationship between parking cost and its price. This has extended to more recent work in pricing and the potential for reform (Willson, 2013). Recent parking pricing reforms, carried out as federally funded demonstration projects, have created additional opportunities for assessments of the benefits that pricing parking correctly may bring to society (Millard-Ball et al., 2014; Pierce and Shoup, 2013; SFPark, 2014).

Much of this has been based on travel behavior research and the balance between economic versus behavioral incentives. For example, Donald Shoup has forcefully argued that "free" parking is not only not free (since its provision requires land and other capital investments as well as ongoing operations and management expenses) but it is a key contributor to many negative environmental, social, economic, and aesthetic externalities. Several studies have shown that charging for parking will lead some travelers to move to other commute options (Chidambaram et al., 2014; Lari et al., 2014), and others indicate short-run parking price elasticity ranging from  $-0.1$  to  $-0.3$ , which are higher than those for gas prices or transit fares (Kelly and Clinch, 2009; Vaca and Kuzmyak, 2005).

That said, even if price increases substantially, many travelers are likely to continue to drive and park. In addition, city officials, businesses and employers often see readily available parking as a necessity for economic development and commercial success, and so continue to plan for parking despite its high economic costs and associated externalities (McCahill et al., 2014; Municipal Research and Services Center, 2015). That said, the literature makes it clear that, more so than things like gas prices, parking pricing increases can lead to mode shifts and be a part of a successful TDM program.

Beyond this, research has shown that transportation choice is tied to market and social factors as well as to public policies (Brock and Durlauf, 2003; Dugundji and Walker, 2005; Marchal and Nagel, 2005), yet the interrelationship between these forces remain under explored along with other influencers like competition and gaming, especially in the face of new technology and mobile proliferation. Policies and incentives can encourage or deter driving behaviors and influence auto ownership (Guo 2013a; Shoup 2005a; Weinberger et al., 2008). Some urban areas or campuses use a 'stick' approach, with high prices for parking, tolls, or usage fees (sometimes called cordon), where the appropriate balance of resource consumption (e.g. roads, parking, etc.) makes the price as close to the marginal cost as possible (Willson, 2013).

That said, some research suggests that this 'stick' approach is economically inefficient (Mcshane and Meyer, 1982; Peters and Gordon, 2009), and other work shows that mixing market norms that come in the form of a 'stick' (like parking pricing) with social norms (like gifts or asking someone to do something out of courtesy for others) can cause confusion to where individuals default to market norms and their respective price anchors (Amir et al., 2005; Ariely, 2008; Heyman and Ariely, 2004). This suggests that bundling a transportation demand management (TDM) or incentives-based approach could be an effective way to better balance the many costs associated with parking in urban areas and on urban campuses (Akar et al., 2012; Benson et al., 2008; Meyer, 1999). For example, offering incentives such as free transit passes, cash back ('cash-out') parking programs, or social media nudge tools to reward alternatives to driving can work (Carrel et al., 2012; Riggs, 2014, 2015; Riggs and Kuo, 2015).

While this might imply a simple market relationship, in reality, many residential, downtown areas, and university and corporate campuses face exaggerated challenges and needs for new parking policies as employment hubs to maintain adequate parking supply and meet access demands of their respective communities, rather than focusing on non-automotive travel (Marsden, 2006). Non-automotive or active transportation (travel via walking, biking and transit) is connected to many sustainability and public health efforts, yet the focus many communities have on auto-mobility works in opposition to public health efforts to increase activity through travel and also generates high fiscal and environmental costs (Black and Schreffler, 2010; Deakin, 2001; Deakin et al., 2004). Expanding urban campuses in particular must balance the adequate provision of parking with land constraints and increased vehicle trips to campus (Riggs, 2014).

The tensions between the high costs of parking and the continued interest in having it be available along with the relationship to TDM have posed a dilemma for many parking providers, and provide the principle impetus for this paper. The literature on parking reveals, on the one hand, a growing critique of common practices, and on the other, a complex and difficult terrain for change from current practices. In this context, we argue that it is useful to look at the impact of parking costs under circumstances where employers must decide whether to consolidate parking in garages as this can weigh heavily on the decision to pursue other transport strategies such as TDM enhancements.

## 3. Cost per parking space using united states' 30-city median cost data: a costing methodology

This inquiry begins by reviewing the cost of providing a parking space in a parking garage. The analysis accounts for the costs of land as well as for construction costs, "soft costs" including design services and environmental review, and recurring operations and maintenance costs for a 30 to 40 year period. It assumes that the parking provider must cover costs at minimum; some providers would expect to turn a profit as well. The method used involves

Download English Version:

<https://daneshyari.com/en/article/6479336>

Download Persian Version:

<https://daneshyari.com/article/6479336>

[Daneshyari.com](https://daneshyari.com)