



The determinants of garage prices and their interaction with curbside regulation



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ABSTRACT

The market for parking is characterized by intrinsic distortions such as cruising in search of a parking space and garage market power. Theoretical studies stress that the price differential between curbside and garage parking fees is critical in addressing this inefficiency; yet, the interactions between the two have received little attention to date in the literature. By drawing on a new self-constructed database for all the garages in the city of Barcelona, we empirically explore the determinants of garage prices. Our results indicate that prices are mainly influenced by fixed and variable cost drivers, the dominance position of the garage in its surrounding market and the garage's interaction with curbside parking. We also find that prices react to the scarcity of parking spaces in the street and to the curbside price fixed by the public authority.

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1. Introduction

Parking policy forms an integral part of mobility management strategies for tackling congestion and improving the environmental quality of big cities. Yet, policy-makers face a severe challenge when having to design efficient parking policies in a scenario of scarce resources, high supply expansion costs and an increasing attention to quality of life (Mingardo et al., 2015). Curbside parking regulation has been widely implemented (and even expanded), but prices have typically been held relatively low. To address excessive curbside demand, parking supply has been expanded through the provision of garage facilities, despite economists' recommendations of the need to solve the common-property resource problem (Anderson and de Palma, 2004; Shoup, 2005; Inci, 2015).

Although curbside regulation has begun to adopt market-oriented perspectives,¹ the question of parking charges remains controversial from a political economy perspective. Some interest groups, including retailers and motorist associations, lobby

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¹ See Pierce and Shoup (2013) and Millard-Ball et al. (2014) for evaluations of the case of SFPark in San Francisco.

for lower prices, while others, most notably environmentalists, seek the introduction of policies that will limit private transport use, seeing parking prices as a readily and more feasible alternative to road pricing. Private operators already provide a sizable off-street parking supply, to the extent that the vast majority of parking spaces in European cities are provided by off-street parking garage facilities (Rye and Koglin, 2014). Municipalities are responsible for curbside parking and in many instances they also manage a significant share of the garage supply that coexists with private operators.²

Spatial competition models that integrate both garage and curbside parking (Arnott, 2006; Inci and Lindsey, 2015 or Arnott et al., 2015) show that the equilibrium in the garage market is reached when the full price of parking at the curb (including the search cost) is equated to the full cost of parking in a garage (including the walking cost) and adjusted through the variation in the levels of cruising for curbside spaces, as both goods are substitutes. The parking market is distorted by both the negative externality associated with cruising for empty curbside spaces and the garages' localized market power attributable to their discrete location, which they exploit by setting fees above the marginal cost. Garage operators take advantage of curbside congestion, as they do not internalize the search externality.³ They stress the need to maintain an appropriate price differential between curbside and garage fees to eliminate cruising. The external cost of cruising is very relevant, as shown by van Ommeren et al. (2011) and Inci et al. (2015); and the role of the price differential is supported by the evidence of the lengthy cruising times experienced in cities where there is a large differential in favor of garages (Shoup, 2005) and the short cruising times for those that face higher curbside fees (van Ommeren et al., 2012).

Few empirical studies of competition in the garage market have been published; but the interactions between curbside and garage parking have received little attention. Lin and Wang (2015) is the only previous study to have examined price determinants, with a specific focus on the relationship between competition and price discrimination in Manhattan's garage market. They investigate how market concentration affects overall garage prices and the curvature of their hourly price schedules. Their results suggest that competition drives the overall price level down and market dominance position increases it.⁴ They also show that zoning density is positively associated with garage prices and that price discrimination diminishes as competition intensifies, indicating that prices for short-term parking decrease at a proportionally higher rate than prices for long-stay parking (price schedules become less curved), due to differences in search behavior.⁵ Other available empirical works focus on garage mergers. Both, De Nijs (2012) and Choné and Linnemer (2012) undertake a retrospective merger evaluation, analyzing the takeover of GTM by Vinci in Paris.⁶ Their findings suggest that the reduction of competition increased price levels, while proportionally larger discounts were applied to long-stay parkers resulting in further price discrimination.⁷ Froeb et al. (2003) analyze the role of capacity constraints in the welfare effects resulting from a merger using computational experiments. Their results suggest that when capacity is binding on the merging firms this factor attenuates merger price effects much more than the corresponding effect in a scenario without a merger, due to the prevention of share-stealing quantity responses.

None of the previous empirical works have specifically integrated the competition between curbside parking and garages in their analyses.⁸ Such relation has only been empirically tested from a demand perspective by Kobus et al. (2013) and Gragera and Albalade (2016). The first analyzes the impact of parking prices on drivers' choice between curbside and garage parking; while the last studies the impact of curbside regulation on public garage demand. Both studies conclude that these goods are not perfect substitutes and that drivers generally might prefer curbside parking (in the analyzed city settings).⁹ Likewise, they both find that users are willing to pay a premium for curbside parking, ranging from €0.37 to €0.60 per hour in Almere (Netherlands) and €0.55 per hour in Barcelona. This can further exacerbate the pricing distortion when garage fees are higher than those at the curbside increasing cruising externality. Additionally, Gragera and Albalade (2016) show that curbside parking regulations are a key determinant of garage demand, and that the characteristics of curbside parking spaces (parking allowance and time limits) play only a minor role while the pricing strategy is the most efficient trigger of behavioral change.

This paper contributes to the literature by exploring the determinants of private garage prices, focusing specifically on cost shifters and on the impact of curbside regulation on garage price-setting decisions expanding previous empirical evidence presented in previous literature. As such, the paper contributes to the scarce literature on garage prices and offers the first analysis of the interactions of these prices with curbside regulations (fees and the regulated use of spaces). By drawing on a new self-constructed database for all the garages in the city of Barcelona, we estimate a price equation that accounts for a variety of price determinants including (1) cost drivers; (2) the market structure of the surrounding area; (3) specific

² See ITDP (2010, 2011) and Gragera and Albalade (2016) for reviews of the US, Europe and the specific case of Barcelona, respectively.

³ Inci and Lindsey (2015) stress that the market failure level varies with the distance between garages, the unitary search costs associated with cruising and the level of curbside fees.

⁴ A unitary decrease in the Herfindahl Hirschman Index (HHI) measured as the squared fraction of facilities managed by a company within the relevant market buffer around each garage reduces the price by 95%, while a unitary increase in the owned share of competitors increases the price by 53%.

⁵ Long-stay parkers are assumed to undertake more intense searches, as their expected gain is greater and more likely to be repetitive.

⁶ The merger between GTM and VINCI gave rise to Vinci Park, the largest garage operator in the French market; currently known as INDIGO.

⁷ De Nijs (2012) findings suggest that a unitary increase in the HHI represents a 68% increase in prices. Likewise, Choné and Linnemer (2012) reported that the merger increased city-owned garage prices by 3%. The authors stress that city-owned garages under concession contracts are subject to price-cap regulations, even though this constraint has never been binding.

⁸ Only Froeb et al. (2003) include an outside/no-purchase option, though it is not specifically considered as curbside parking, and they assume that garage parking is always preferred to the outside option.

⁹ In many EU and US cities curbside parking tends to be relatively ubiquitous and might offer a walking cost or information salience advantage with respect to garages, even this will depend on city specific characteristics. Note that safety or weather conditions might even counterbalance such advantages if they exist.

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