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Introduction to the Special Issue on the Economics of Parking[1]

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The economics of parking is an emerging research area attracting growing attention of transportation economists, as well as engineers, planners, practitioners, and policy makers. Analysing parking behaviour and the effects of its supply, demand, and regulation has become essential for our understanding of major aspects of mobility, such as modal choice, congestion costs, car ownership decisions, and destination choice.

Parking markets affect not just mobility issues but also the functioning of other markets. One of the most important yet underrecognised reasons for why parking is important in cities is that it affects the price of everything else in a city. Most economic transactions involve transportation. Most transportation involves parking. And parking is a vast land use, which is expensive everywhere. Then, if parking is free or underpriced, its costs will hide in the price of everything else in the city. If parking is too expensive or too difficult to find, it also influences driver behaviour which, in turn, may affect other markets, and produce external social costs or benefits. As a consequence, a variety of markets are affected by how parking is supplied and regulated. This naturally arouses the interests of researchers and practitioners of different fields on how parking affects various markets. The markets for housing, leisure, and shopping are just a few examples that are shown to be significantly affected by the functioning of the parking market.

This special issue continues to investigate several aspects of parking, and in particular the important link between parking and other goods from both efficiency and equity

[1]The idea for this special issue grew out of the 'International Workshop on the Economics of Parking', held in Barcelona (Spain) on 28 November 2016, but it was open to all interested contributors. We would like to thank Steven Morrison and David Gillen for allowing us to edit it for the *Journal*, and we thank the referees for providing valuable comments on the papers submitted for the special issue.

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perspectives. The topics contained in this issue include parking search behaviour, external costs of parking, consequences of pricing parking, the impact of parking on housing and shopping markets, and the role of drivers' information on the functioning of parking markets. In addition to their academic relevance, the papers in this issue provide valuable insights into the development of better parking policies.

The first two papers in the issue concentrate on parking search. Hampshire and Shoup (2018) propose a new method to estimate what share of traffic is cruising for parking. The method relies on the observation of the number of cars that pass a newly vacated space before a driver parks in it. This provides urban planners and traffic engineers with a quick, cheap, and approximate method to measure cruising. Application of the methodology to central Stuttgart shows that 15 per cent of traffic was cruising for parking. Brooke *et al*. (2018) explore the factors influencing parking search time in the UK. They undertake an on-street parking survey with individual drivers in four cities to investigate the influence of personal, trip, socio-economic, physical, time-related, and price-related variables on parking search. The statistical model they develop enables formulation of reliable parking policies.

De Vos and van Ommeren (2018) analyse walking cost externalities that drivers impose on each other. They match licence plates with residential parking permits to measure drivers' walking distances in several neighbourhoods in Amsterdam. They then estimate the effect of the parking occupancy rate on walking distances, and find that each parked car imposes 8m of additional walking distance on every next resident who wants to park in the neighbourhood. This limited external cost implies that parking demand is highly differentiated across space in residential areas of Amsterdam.

Studies on parking search have traditionally been efficiency-centric, which often calls for demand-based parking pricing. We know little about the equity implications of such pricing. Chatman and Manville (2018) empirically address this equity issue by asking if such pricing disproportionately burdens lower-income households. In their investigation of San Francisco's dynamic-pricing experiment (SFpark), they find little evidence that higher-priced parking displaces lower-income drivers, either by reducing their parking durations or leading them to park less overall. Therefore, it appears that higher prices make lower income drivers less likely to use street parking, but they are less sensitive to prices once they have parked.

De Groote *et al*. (2018) look at the impact of the introduction of paid parking on housing prices in the Netherlands, where paid parking is usually introduced along with residential parking permits. When parking is free, residents use the kerb as their own parking garage. Therefore, if the city starts charging for parking, housing prices must decrease. Going against this are the positive effects of reduced cruising and congestion. In their empirical study of Amsterdam and Utrecht, De Groote *et al*. (2018) find that the introduction of paid parking has no effect on housing, which means that the residents' additional parking costs are compensated by the benefits of reduced parking search and congestion levels.

The next two papers in the issue analyse the interplay between parking fees and retail prices. The most interesting environment in which to analyse this interplay is a shopping mall, which is a two-sided market serving both customers and retailers. Most suburban malls provide free parking, while some urban malls do charge for parking. To identify the conditions for subsidised and free parking in suburban malls, Molenda and Sieg

(2018) analyse a spatial model of two suburban malls leasing store space to retail chains that compete for consumers. When parking is provided free, its costs are embedded in the retail prices. The paper by Inci *et al*. (2018), for which David Gillen handled the review process, concentrates on a retailer that provides parking services to customers, and allows for differentiated parking fees in the form of valet services. The paper shows that the unregulated market equilibrium requires self-parking to be free, while valet parking can be priced above or below cost. The social optimum also calls for free self-parking; however, this time, valet parking is always priced below its cost. As a result, a significant portion of parking costs is embedded in the retail prices. Both papers predict that there are important links between parking fees and retail prices; this prediction is yet to be empirically tested.

The last paper in the special issue is by Albalate and Gragera (2018), for which David Gillen handled the review process, and focuses on information imperfections in parking markets. In general, drivers may not know all the available parking options in their destinations. Even if they knew, they might have insufficient information (such as about pricing schedules) in order to compare those options. In their analysis of the city of Barcelona, Albalate and Gragera (2018) provide ample evidence on the presence and extent of information frictions in the parking market. They also investigate if these frictions translate into significant inefficiencies.

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