Parking Policy Literature Review Completed 6/25/19

Effects of Parking Provision on Automobile Use in Cities: Inferring Causality (McCahill, Garrick, Atkinson-Palombo and Polinski, 2015)

Rather than parking policies adapting to an already increasing automobile mode share, this paper suggests that parking provision actually induces a demand for driving in cities (i.e. rather than parking adapting to increased demand, cities create more traffic by supplying more parking). Using limited data from nine medium-sized cities in 1960, 1980 and 2000 (i.e. US Census' journey-to-work surveys, aerial photographs) and prior research, the authors are able to analyze changes in both variables over time.

Since the correlation between parking capacity and automobile use is well-documented, they use an assessment borrowed from epidemiology—the Bradford Hill criteria—to assess causality. This seven-part assessment centralizes the question: will levels of automobile use be influenced by a change in parking supply? The authors acknowledge the difficulty in pinpointing causal effects within transportation studies, however, they argue that this comprehensive assessment allows them to make reasonably definitive claims about how parking will potentially impact travel behavior.

The nature of transportation studies make some of the criteria difficult to assess, particularly the lack of granular historical data and the complex relationship between parking and driving. Despite these challenges, the authors make a compelling case for limiting and reducing parking capacity in cities as a means for reducing automobile use and its negative externalities. An important finding from their study, showed that increasing provision from 0.1 to 0.5 parking spaces per person results in a roughly 30% increase in automobile use.

2015 Emerging Trends in Parking (International Parking Institute, 2015)

This report from the International Parking Institute covers trends and societal perceptions of parking in urban areas. A shift from the trends detailed in the 2013 document, this more recent report highlights the emerging "desire for more livable, walkable communities." The report also suggests that parking professionals have had to broaden their responsibilities to accommodate this shift in demand, with many professionals reporting their programs encompass a number of non-parking related elements (e.g. TDM, encouraging alternative transportation modes, and commuter trip reduction programs).

Of particular interest to MOAPS, this report identifies the role minimum parking requirements can play in creating excess parking constructions. 50% of professionals agree that these zoning requirements are in need of reformation, and that a "lack of understanding about the value of parking minimums" is to blame. Other takeaways include the prevalence of parking professionals using or laying the groundwork to use big data in parking management decisions, changes in technology continue to be driving the changes in this industry, and neighborhood opposition is ranked fourth in barriers to policy reform.

The High Cost of Free Parking (Shoup, 2005). Article format read for review, retrieved from Access Magazine.

Shoup looks at how parking minimum requirements have resulted in greater traffic congestion, higher number of SOVs, higher housing costs, and lower residential density. His argument is as follows: parking minimums subsidize driving and then planners limit development to reduce traffic congestion and its

negative impacts. Following this logic, he first establishes a cost to developers for generating new parking spaces. In doing so, he finds costs per-parking space have steadily increased since the 1960s. This is attributed to land-use constraints and a need to perform costly underground construction activities. He characterizes the costs for generating parking as an implicit demand from government to subsidize automobiles. These costs are felt in unintended ways, for example since a new apartment building will need to create one parking space per apartment, they will opt to create larger, more expensive apartments.

Driven by parking minimums that accommodate new traffic brought in by new developments, parking spaces are created to satisfy an anticipated need. Shoup argues that within these decisions, planners forego their professional judgement and instead respond to the political pressure of citizens who expect somewhere to park. As an alternative to parking minimums, Shoup advocates for market-based prices for parking that are high enough to ensure no shortages. It should be noted that this argument along with his logic behind approval of measures like "Parking Benefit Districts" appear as misguided given insights that centralize equity.

Modernizing Mitigation: A Demand-Centered Approach (SSTI, September 2018)

This guidebook for transportation and planning practitioners advocates for a modernized, more comprehensive approach to transportation planning. Conventional methods revolve around supplying infrastructure and services that accommodate a city's growth. Transportation Demand Management, instead, argues for the need to mitigate the underlying causes behind traffic congestion. Operationalizing this approach lies in practitioners using a multi-modal perspective to consider elements of accessibility as the primary metrics for management decisions. Rather than focusing on auto-centric investments, this perspective allows decision-makers to more fully consider that range of benefits and consequences their decisions might have on their respective communities. Examples of TDM measures include improving alternative transport infrastructure, introducing complementary land uses to minimize travel, and providing first- and last-mile connections to high-capacity transit.

The guidebook features a case-study, relevant to MOAPS, that covers a TDM mitigation in Cambridge, MA. Cambridge's Parking and Travel Demand Management Ordinance requires developers of large (requiring 20+ stalls) non-residential properties to reduce the drive-alone rate to 10% below the average rate for their census tract (identified in the 1990 journey to work data). Properties with 5-19 stalls are required to implement three TDM measures. If goals are not met, the city charges $10 per parking space/day until they are. Cambridge views this ordinance as successful, with SOV averages decreasing throughout the years. Because the effect of has been substantial, the city believes they can similarly achieve transit goals by introducing a flat maximum SOV rate of 28% for new developments.

Cambridge's Recommended TDM Measures
subsidized transit passes and other incentives
shuttle services
ride-sharing services
bicycle and pedestrian facilities
flexible working hours
preferential parking for Low Emission Vehicles/Zero Emission Vehicles/bicycles/ carpools/vanpools

The effects of on-street parking and road environment visual complexity on travel speed and reaction time. Edquist J, Rudin CM, Lenné MG (2012). Accident Analysis & Prevention 45:759–765. doi:10.1016/j. aap.2011.10.001

The influence of street parking on travel speeds seems to be fairly well-observed, as it comes up quite a bit in more generalized research on the relationship between road capacity and traffic safety. A number of papers cite the increased crash risk tied to on-street parking (Greibe, 2003; Pande and Abdel-Aty, 2009). A paper by a team in Australia looks directly at the influence of curb parking on travel speeds. Rather than focusing on road capacity, the authors conflate its effects with an increased *environmental visual complexity* for drivers. More surroundings (i.e. parked cars, potential parking spaces) require higher mental workloads (more potential risks), which then results in a particular driving behavior. Their experiment found that in roads with on-street parking, **drivers lowered their speed** and reported an increased mental workload (Edquist et al. 2012, 763).

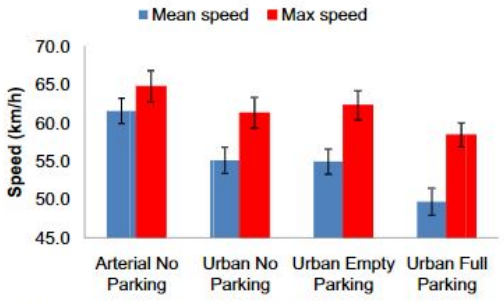

Fig. 2. Mean and maximum speed (for non-following blocks only) by road environment and parking condition (bars represent 95% CIs).

Importantly, their study observed slower reaction times to peripheral targets and slower response times to unexpected pedestrians on urban roads with full on-street parking versus urban roads with empty on-street parking and arterial roads with no parking. Despite reducing speeds to compensate for a more complex driving environment, the behaviors observed, the authors argue, "is likely to translate to higher crash rates in real world, urban areas where vehicles are parked on-street" (763).

Stakeholder perspectives on the value of car parking. Isobel Frances Beetham, Marcus Paul Enoch, Martin Morgan Tuuli & Lisa Jane Davison (2014). Urban, Planning and Transport Research, 2:1,195-214, DOI: 10.1080/21650020.2014.885385

This paper aims to provide a comprehensive look at how various stakeholder groups value parking. Going beyond the economic framework primarily used in this sort of research, the authors conduct interviews with academics and stakeholder representatives to assess which issues influence how stakeholders value parking and which are frequently targeted by parking policies. The purpose of this research is to better equip transportation researchers and policy-makers with an understanding of how people use parking and the extent to which parking affects them. **Table 2** outlines the groups of stakeholders identified.

The authors identify 1) land-use conflicts, 2) a lack of understanding, 3) population density, 4) interconnectedness with other municipal aims, 5) an emotional attachment to one's ability to park, and 6) a challenging decision-making environment as the most significant elements of parking that are of concern to stakeholders and policy-makers. For how these groups value parking, the authors identify: 1) values are determined by end-goal of stakeholders, 2) the perspective stakeholders have on parking as potential revenue varies, 3) cities see parking as a leverage point for broader city-level policies, 4) a lack of complaints often allow city officials to avoid parking issues, 5) parking is often an unwanted cost for suppliers (i.e. developers, retailers), and 6) consumers see parking as a necessary facilitator for their lifestyle (particularly, free parking).

Additionally, the policy solutions most commonly used are 1) Pricing: often seen as a less effective strategy (especially when compared with *road user charging*), 2) Oversupply: supply more parking than necessary, the strategy most commonly used in the US, and 3) Free or Low-Cost to User:

Policy options to support the adoption of electric vehicles in the urban environment. Bakker, Sjoerd & Jacob Trip, Jan. (2013). Transportation Research Part D: Transport and Environment. 25. 18–23. 10.1016/j.trd.2013.07.005.

This paper covers how municipal policies can impact the introduction of electric vehicle technologies. Particularly relevant to MOAPS, the authors review policymakers' assessments of charging station policies. Charging station can be purchased and installed as part of the public works, however they can also be acquired through a public-private partnership. All policymakers preferred a cost-sharing scenario for new charging stations, in which a private investment is matched by municipal funding. They were divided on where to prioritize charging station installations (i.e. on-street vs private properties), and agree on the crucial role spatial research will play in deciding this strategically.

The paper highlights the emphasis policymakers should put on an explicit goal for their decisions on EV infrastructure. Policies should aim to either provide EV charging stations *or* EV parking spaces. EV parking spaces with charging stations, attempt both, and the authors find these spaces are filled with fully-charged EVs 50% of the time.

The Unequal Burden of Parking Requirements. *Parking and the City*, Shoup, Donald C. Routeledge, 2019, pp. 97–100.

Shoup argues that the parking-induced sprawl of cities like Los Angeles, necessitates owning a vehicle. Families with zero or negative net-worth (income minus debts) feel this pressure, and must finance cars at subprime interest rates, further indebting themselves. Shoup shows how the United States—with relatively low household median net-worth compared to other countries, but high mean net-worth (a few, very rich American households)—experiences the highest level of inequality in the world, according to this metric. Despite its households' relatively low net-worth, the US has a disproportionately high rate for car-ownership (81%) compared to other nations. Shoup concludes, "Our wealth does not explain our greater number of cars. Instead, our high parking requirements help to explain our greater number of cars" (Shoup 2019, 100).

The Fiscal and Travel Consequences of Parking Requirements. *Parking and the City*, Shoup, Donald C. Routeledge, 2019, pp. 125–132.

A team of transportation scholars look at how decisions around land-use determined levels of car-use and travel behavior in cities. The general findings show that cities which decided to dedicate a relatively-high level of surface area to parking (i.e. Hartford, New Haven, Lowell) suffered shrinking rates of residents and employees in the city between 1960-2000. Furthermore, two of those cities experienced the highest growth in auto mode travel share. These findings support other research that suggests increased parking capacity is linked to economic and environmental decline.

SFpark. Primus, Jay. In *Parking and the City*, 322-43. Routeledge, 2019.

San Francisco implemented a new parking program that successfully improved the parking experience and made it easier for citizens to find parking. The program also provides benefits like increased transit speed and emissions reductions. The basic strategies the program used are: 1) demand-responsive pricing (occupancy data is needed), 2) allowing customers to use credit cards/pay by phone, 3) discounts at garages during off-peak ($2 off/hour), 4) time limits extended or eliminated (their approach focuses on demand, rather than arbitrary time limits), 5) improved information channels for where to find parking (i.e. on-street sensors), and 6) emphasis on clarity and simplicity of the city's parking program (avoid governmental aesthetic/language).

The program resulted in average parking prices dropping; along with its transparent, data-driven pricing, this allowed the city to avoid complaints/issues of government distrust. The program improved parking availability for both on- and off-street parking, decreased the average vehicle miles travelled (and thus, emissions) decreased, and peak period congestion decreased. Allowing meters to be paid-by over/by credit card, along with the extended time limits, resulted in an increased net parking revenue. Following SF*park*'s success, Los Angeles, New York, Seattle, and DC have begun to use its approach.

Parking and Affordable Housing in San Francisco. Chapin, Jia and Wachs. In *Parking and the City,* 141-47. Routeledge, 2019.

This chapter from *Parking and the City*, covers a study performed to look at the effects of off-street parking on property values. Looking at five neighborhoods in San Francisco, the authors track the change in properties with the elimination of parking requirements on new developments. Buildings with no requirement offered 60% less parking and were able to complete the units for 30% cheaper. This allowed the units to be offered for less, with 23% of units meeting the city's requirement for affordable housing (the city's requirements for "affordable" are not identified), rather than the 6% of buildings with a parking requirement. Despite this finding, one developer that was interviewed said they tried to include as much parking that the footprint allowed, suggesting that cities may need to actively limit off-street parking if they wish to improve affordability of housing.

The Heart of the City; Creating Vibrant Downtowns for a New Century. Alexander Gavin, 2019

(Excerpt from Planning Magazine) The books describes three kinds of big-city downtowns – growing (such as Houston), declining (Detroit), and resurging (Lower Manhattan) – and how they got that way. At the heart of the book are six objectives "all of which can be of benefit to any downtown at any time" provided the local market is well understood:

- Establish a distinctive image
- Provide easy access to downtown and convenient circulation within it.
- Create an ample public realm.
- Sustain a "livable downtown environment" to attract and keep people there.
- Reduce the cost of doing business downtown.
- Make it easy to alter land uses, build new buildings, and remodel existing ones.