

Minimum Parking Review: Supplemental Documents

Academic Research on Minimum Parking Requirements

Reduced off-street parking leads to fewer cars per household

One examination of the statistical relationship between car ownership and the availability of on- and off-street residential parking, along with other household variables, in New York City, found that *"parking supply can largely determine car ownership decisions (and that parking supply) actually outperforms household income and demographic characteristics"* as determinants of car ownership. This study goes on to address the question of whether the findings can be generalized to dense urban settings other than New York, and concludes that they probably can:

*"The results may not be applicable to Phoenix or Las Vegas, where parking is generally over-supplied and most housing stock was built after World War II, but for cities like London, Boston, San Francisco or Philadelphia, where parking is generally in shortage and a diverse array of residential parking types are available, a similar parking-car ownership relationship might exist."*¹

It is worth noting that the inner urban area (Area X as defined by the present report) corresponds largely to the pre-war boundaries of Ottawa's development; and, indeed, the 2011 Origin-Destination Survey find significantly lower rates of household car ownership in this area.

Guaranteed parking at home leads to increased car usage

Another study examines the relationship between the convenience or certainty of parking availability at home to overall car use. The study found that *"parking convenience at the home origin indeed matters to household car usage. When parking is guaranteed back home, households are more likely to drive cars instead of using other modes, make more car trips, and travel longer vehicle miles."* The author's model indicates that the certainty effect increases household VKT (Vehicle Kilometers Travelled) by 10%. Since off-street parking is generally more certain than on-street parking (because its use is restricted to residents of the building, if not to a specific household) the principle is relevant to off-street parking. The author goes on to discuss the minimum off-street parking requirements and concludes that *"(t)he certainty effect further suggests that applying (a minimum off-street parking requirement) to infill developments in a dense urban setting will result in a significant increase of car usage (even when car ownership is fixed.)"*²

¹ Guo, Zhan (1). "Does residential parking supply affect household car ownership? The case of New York City." *Journal of Transport Geography* 26 (2013) 18-28.

² Guo, Zhan(2). "Home parking convenience, household car usage, and implications to residential parking policies. *Transport Policy* 29 (2013) 97-106.

Other research on the subject also finds *"a clear relationship between guaranteed parking at home and the greater propensity to use the automobile for journey to work trips even between origin and destinations pairs that are reasonably well and very well served by transit."*³

Yet another study found an even stronger relationship in a case study of two neighbourhoods in boroughs of New York, suggesting that guaranteed parking at the home end of commuter trips results in more commuting by car even when other factors tend to support other modes:

*"Indicators such as income, car ownership, density, government employment, and the difference between drive and transit times to the central business district (CBD) predict a higher share of auto commuting by Park Slope (Brooklyn) residents (than by residents of Jackson Heights, Queens.) Yet Jackson Heights residents are 45% more likely to drive to work in the Manhattan CBD and 28% more likely to commute by car in general." (Emphasis in original.)*⁴

Off-street parking requirements come at the expense of on-street parking availability

In some cases, providing off-street parking comes at the expense of a comparable number of on-street spaces:

"A survey in Mission District, a 40-block neighbourhood in downtown San Francisco, found that curb cuts take 30 percent of total curbside length, and result in a combined total loss of 356 out of 878 potential on-street parking spaces. Since there are only 883 cars registered in the neighbourhood, all but five of them could have parked on the street simultaneously if garages and curb cuts had not been added. In other words, the minimum requirement is essentially 'converting' on-street parking into off-street parking in the neighbourhood. Since parking certainty (for residents) is improved, households are likely to drive more."⁵

Increases in parking supply cause increased driving mode share in sample cities

Integrating previous research showing a correlation between parking supply and automobile use, one study applies principles of epidemiology (the so-called "Bradford Hill criteria") to assess whether increases in parking supply can be said to actually cause more driving. As an example, the study found that an increase in per-capita parking supply in nine subject cities during one twenty-year period (1960-1980) is very strongly associated with an increase in automobile mode share in the subsequent twenty-year period (1980-2000), satisfying the

³ Weinberger, Rachel. "Death by a thousand curb-cuts: Evidence on the effect of minimum parking requirements on the choice to drive." *Transport Policy* 20 (2012) 93-102.

⁴ Weinberger, Rachel et.al. "Guaranteed Parking – Guaranteed Driving: Comparing Jackson Heights, Queens and Park Slope, Brooklyn shows that a guaranteed parking spot at home leads to more driving to work." *University of Pennsylvania/Transportation Alternatives* (2008.)

⁵ Brown, Mary. "Shifting Landscapes of Mobility: Reconfiguring Space in the Mission District for Automobiles." Master thesis, San Francisco State University. (2007.) Quoted in Guo 2013 (2).

criterion of temporality. (Conversely, there is a very weak association between increases in car mode share and subsequent increases in parking supply, suggesting that it is not parking supply that responds to increases in demand, but that demand increases following increased supply.)

The study found that "an increase in parking provision from 0.1 to 0.5 parking spaces per person is associated with an increase in automobile mode share of 30 percentage points." It is also demonstrated that "a majority of the Bradford Hill criteria can be satisfied using the available data, which offers compelling evidence that parking provision is a cause of citywide automobile use."⁶

Dr. Donald Shoup, The High Cost of Free Parking

Donald Shoup is a professor of urban planning at the University of California, Los Angeles, with a background in economics. His 2005 book *The High Cost of Free Parking*⁷ provides extensive research and analysis of parking in cities, including the unintended consequences of zoning requirements to provide on-site parking. At 750 pages the book is too long to summarize here. However, there are three key points worth noting.

Firstly, the minimum parking requirements in North American cities are not, as is often supposed, based on any coherent theory or empirical basis. Most cities have historically drawn their parking requirements by copying those of other cities, or else by referring to data published by the Institute of Transportation Engineers' Parking Generation tables. The latter data source, moreover, is shown to be deeply problematic, relying as it does on small sample sizes, usually from suburban sites with little or no public transit, among other methodological and statistical problems.⁸ Shoup effectively tears down the notion that the existing approach to minimum parking requirements, in place since the end of the Second World War, is much better than guesswork. Indeed, *"Most parking requirements amount to little more than a collective hunch."*⁹

Secondly, minimum parking requirements systematically over-estimate the need for parking and distort travel behaviour. The key problem is a disregard for the impact of price on demand. Parking costs money to provide, but the practice of forcing development to include parking hides the cost from the user and instead passes it indirectly on to consumers, businesses and tenants. (If you have to provide the parking anyway, it's easier to bundle the cost with the rent, service or housing you're providing than to require users to pay directly for it.) The hidden cost

⁶ McCahill, Chris et.al. "Effects of Parking Provision on Automobile Use in Cities: Inferring Causality" Submitted to Transportation Research Board, November 13, 2015.

⁷ The updated paperback edition, released in 2011, is referred to elsewhere in this report as Shoup 2011.

⁸ Shoup 2011, p.28

⁹ In ITE's defense, that organization has become increasingly concerned with the over-reliance on its tables as a formula for determining parking minimums, and warns users against this tendency. As early as 1990 the Institute noted that *"It must be recognized that sizing a parking facility or setting parking requirements is a policy decision, not merely a technical one. It must be made in light of the objectives of the developer or public agency; it does not simply drop out of a formula or equation."* (Using the *ITE Parking Generation Report*. Steven A. Smith/ITE Technical Council Committee 6F-44. *ITE Journal*, July 1990. p.25.) The most recent edition of *Parking Generation* contains extensive cautions against over-reliance on its tables as a definitive estimate of parking demand.

of parking is dispersed through the economy and borne by everyone, whether they drive or not, effectively encouraging and subsidizing more driving. Minimum parking requirements also over-estimate demand by conflating observed peak parking occupancy of free parking facilities (often from a site with very different urban context) with actual parking demand, the latter of which is influenced by price. As a result, the required parking facilities are largely empty much of the time, even as they force an urban form that penalizes walking, cycling or transit use.

Thirdly, minimum parking requirements are actively detrimental to city building. From the preface to the paperback edition: *"(T)he prohibition against buildings without ample parking... distorts transportation choices, debases urban design, damages the economy, and degrades the environment.... (M)inimum parking requirements do more harm than good and should be repealed."*¹⁰

The present report does not go so far as to recommend the total abolition of minimum parking requirements throughout the City at this time. However, it proceeds from the recognition that there is little justification to treat existing parking minima as particularly robust or grounded, especially in urban locations where densities, mix of land uses, planned function and non-auto transport options are or are becoming more viable. In doing so, it draws partly on available academic research around how parking supply affects travel behaviour.

¹⁰ Shoup 2011, p. xxxi