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The effect of minimum parking requirements on the housing stock

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ABSTRACT

The cost of parking is in many cities subsidized and instead channelled through higher housing prices, wages, taxes, etc. The effects on other markets are principally well known, but the work on the area is limited. In this paper, we study how parking norms affect the size of the housing stock. Our analysis is based on a model of the rental, asset- and construction markets, the results are quality-assured by interviews with market actors. Prices and profits are affected when constructors are forced, through parking norms, to build more parking spaces than the customers demand. Parking norms reduce the housing stock by 1.2% and increase rents by 2.4% (SEK 300) in our example suburb.

1. Introduction

The cost of on street parking is in many cities subsidized in the sense that the fees do not cover total societal costs. This implies that developers face little incentive to construct on-site parking for new buildings, as it is difficult to cover the cost of this given the low costs of on street parking. A typical response from policy makers is to require a certain number of on-site parking sites to be provided in order to allow new construction. This policy instrument is referred to as a parking norm.

In this paper, we study the effect of parking norms on the size of the housing stock (as compared with a situation without such norms, where parking is built based on profitability). This is done with a model, based on DiPasquale and Wheaton (1992), made up from three markets:

- Rental market (where the supply and demand for space creates an equilibrium rent).
- Asset market (where the equilibrium rent gives a value of the housing stock).
- Construction market (where the value of the housing stock affects the amount of new construction).

Earlier work in this area is limited (especially empirical articles are scarce). We have not found any literature with an analytical model aimed at capturing the effects of parking norms on the housing stock. An obvious alternative to analytical models is to study the effects on a macro level with econometrics, but the limited variation in the explaining variable (parking norms) renders this approach unfeasible. The studies that do examine the relationship between parking norms and the housing stock evaluate local natural experiments where parking norms in a block/neighbourhood is removed. A major difficulty in these studies is to isolate the effect of parking norms, since several changes are made at the same time.

The main contribution of this paper is to model and analytically sort out the effects on the housing stock and the mechanisms underlying these effects. We roughly calibrate the model to a suburban area just outside Stockholm, Sweden (Hägersten). We also provide some insights from a series of interviews conducted with market participants. Given the current debate on the housing shortage in the expanding regions in Sweden, this is an important and timely subject. Clearly, there are several underlying causes to the current situation on the housing market. However, one main cause is that there is, for various reasons, too little new construction entering the market. To the extent that parking norms hold back new construction, it is important to provide a better understanding of why this is the case, and whether there are reasons to change parking policies.

In this paper, we focus only on the consequences of parking

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norms on the housing market. We do not study work or visitor parking, even though these markets are also regulated through parking norms. Nor do we study flexible parking norms/mobility management. There are two reasons for this. Firstly, there are several different kinds of flexible parking norms, which mean that this would have required a study of its own. Secondly, the qualitative results of parking norms on the size of the housing stock are principally the same, since they increase the construction costs, and making them flexible only makes the effects smaller. The effect of urban sprawl on the size of the housing stock is not investigated in this paper, even though it is reasonable to think that parking norms affect urban sprawl, both since the space dedicated to parking may make housing sparser and since parking may indirectly stimulate car ownership which in turn affects the spatial structure, Shoup (1997).

The remainder of the paper is structured as follows; Section 2 provides a background on pricing, supply, norms, costs and residents' willingness to pay for parking. The model is presented in Section 3 and the results are given in Section 4. The interviews with market actors (project development companies, long-term property owners, municipality representatives and brokers) are presented in Section 5. Section 6 sums up the conclusions.

2. Literature and background

The literature on the supply of parking spaces is scarce, but there is more written on pricing of parking at a given supply. The early literature, e.g. Roth (1965), assumed that parking is mainly a private good and that the market for parking as well as the markets for substitute and complementary goods is mainly free from distortions. This leads to the first best-conclusion that parking should be priced at its marginal opportunity cost. An obvious second best argument is that congestion on roads indicates that road traffic in cities is under-priced, meaning that parking fees should be set higher to compensate for this (Glazer and Niskanen, 1992; Verhoef et al., 1995; Arnott and Inci, 2006, 2010; Bonsall and Young, 2010). Another argument for setting prices above direct marginal cost is the external effects of searching for a parking space. A common conclusion is that the price should be raised until search traffic almost ends, Arnott and Rowse (1999a, 1999b) and Arnott and Inci (2006). Introducing private parking garages makes the analysis more difficult. Calthrop and Proost (2006) argue that the price of street parking should be set equal to the price in private parking garages, since the latter is likely to be equal to marginal cost.

A general argument for steering supply with parking norms is that parking fees are generally set below market prices, which creates a free-riding problem for housing constructors. They prefer to let their customers' park on subsidized street parking, the problem being that all housing constructors cannot free ride since the space for street parking is limited. The juridical status of parking norms differs between countries (see COST (2005) for an overview). However, the basic principle is the same; constructors must build a specified number of parking spaces per apartment, square metre of store area etc. Municipalities usually also regulate whether parking spaces may be built on the ground, or must be built in car parks or in garages. The situation is illustrated in Fig. 1 below.

In Fig. 1, D_0 and S_0 illustrate the initial demand and supply curves for parking, respectively. Given the initial demand and supply, the market clearing price would be P_1. Setting a price for parking below the market clearing price P_1, such as P_0, results in an excess demand of $Q_D - Q_S$. The fact that more customers are willing to park at price P_0 than there are parking spaces results in an efficiency loss. The first best solution would be to raise the price

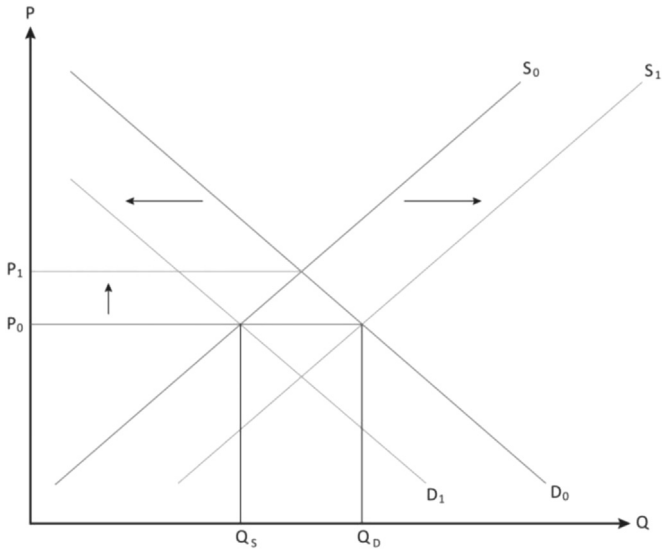

Fig. 1. Illustration of excess demand on parking and possible solutions.

to P_1. Alternatively, one could introduce second best measures that shift the supply function to S_1 or the demand function to D_1.

While the price of street parking is decided at the municipal level and affects all public streets, the supply policy instrument studied in this paper (parking norms) affects only new apartments. In the context of the figure above, parking norms forces entrepreneurs to build Q_D amount of parking. Demand policies could either affect the demand from the people living in the new houses (usually referred to as flexible parking norms or mobility management) or the general demand for parking (fuel taxes, congestion charges etc.).

The empirical background of minimum parking requirements is usually vague, most often it is based on peak demand (at no or low price) at similar areas without considering costs. It is also hard to find support in textbooks for urban transport planning, Shoup (1997). It is difficult to find motivations for parking norms in Sweden, although it is very easy to find the actual norms. The situation seems to be the same in most countries (a Google search results in a lot of parking norms, but only motivations like "necessary to ensure parking availability"). As in many countries, the history of Swedish parking norms dates back to the 1950s when planners where inspired by planners in the USA, Envall et al. (2014). To see how parking norms in Sweden are actually set today, we have studied the relation between parking norms and demand for parking for nineteen Swedish municipalities with more than 50,000 inhabitants. This has been done by calculating the average number of cars per apartment in each municipality respectively, which is illustrated by the dotted bars in Fig. 2. The solid bars are the parking norms applied by the different municipalities.

The average quota for these nineteen municipalities between parking norms (parking space per apartment) and the number of cars per apartment is 1.02 for central areas and 0.92 for the rest of the municipalities.[1] This implies that project development

[1] Parking norms, as written in the respective municipalities' parking policies are with few exceptions set for three zones—inner city, central areas and periphery areas. In the parking policies the parking norms are either expressed as number of parking spaces per apartment or as parking spaces per 1000 m^2 residential area, based on data from Statistics Sweden we have in the latter case assumed an average size of 85 m^2. Official statistics for average car ownership (number of cars per person) in the municipality has been used (Statistics Sweden, 2013). For the central parts, we have assumed the car ownership to be 85% of the average for the municipality. We also assume that on average 1.8 persons live in each apartment.