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Developers pay developer charges

Cameron K. Murray

The University of Queensland, St Lucia, QLD 4076, Australia.

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ABSTRACT

Conversion of land to more intensive uses often comes with charges known as impact fees, or developer charges (DCs). Town planning practitioners typically view these charges as economically benign but there remains an academic debate about whether they can increase prices and depress sales volumes. Existing empirical studies of the price and quantity effects of DCs are limited by a lack of naturally occurring variation in the DC size. It is therefore difficult to isolate behavioural effects from the mechanical relationship of DC and price arising from larger dwellings being levied with higher DCs. To overcome this identification problem we use data that incorporates a surprise policy change in Queensland, Australia, that introduced a cap on DCs. Councils responded by changing DCs, both upwards and downwards, for different dwelling types in different local council areas. Our model estimation shows that there are no measurable effects on price or quantity of new dwellings from DCs, supporting the planning practitioner's view of the charge being economically benign and fully incident on the landowner, even when the landowner is a property developer. When we instead include the baseline DC for each sale prior to the policy change, the problem of capturing only the mechanical effect arises once again. Model results using this baseline DC are similar to previous studies that claimed large behavioural price effects from DCs. The results are consistent with a real options view of the developer's economic situation, a view that also predicts that increases in DCs can increase the quantity of new dwelling sales, a pattern also found in the Queensland data.

1. Introduction

Charges on landowners who convert land to more intensive uses are known as impact fees, or developer charges (DCs), and are a common revenue source for sub-national governments across the world. While practitioners in town planning see these charges as economically benign, there remains an academic debate about their potential to increase prices and depress sales volumes of new dwellings (Bryant, 2017; Hsieh, Norman, Orsmond, et al., 2012; Nelson, Bowles, Juergensmeyer, & Nicholas, 2012; Ruming, Gurran, & Randolph, 2011; Mathur, 2007; Burge & Ihlanfeldt, 2006; Ihlanfeldt & Shaughnessy, 2004). For policymakers facing the challenge of funding new infrastructure while also improving housing affordability by keeping prices low, such debates are far from academic. If the practitioner's view is borne out, DCs are likely to become entrenched as important sources of local government funding. If not, it is likely that DCs will be phased out in areas with political sensitivity to high housing prices.

To resolve this debate, this study is the first to use natural experimental conditions to control for endogeneity in the determination of DCs. This is crucial, since the variation in DCs is often mechanically correlated with the value of dwellings by its construction, as DCs are usually determined by the size of the property, either by area, number of bedrooms, or another metric closely related to value. The true behavioural price-effect is thus difficult to untangle in the absence of such experimental conditions (Mathur, 2013; Billings & Thibodeau, 2013; Evans-Cowley, Lockwood, Rutherford, & Springer, 2009; Burge & Ihlanfeldt, 2006). This study capitalises on surprise policy variation of DCs to cleanly identify their behavioural effect on price and new housing quantity.

The surprise political decision by the Queensland government to cap DCs occurred on 12 April 2011 as a response to the property development lobby which had argued that high DCs led to high prices. The cap for dwellings with two bedrooms or fewer was $20,000, and for dwellings with three bedrooms or more it was $28,000. This meant that some local councils were forced to lower their DCs for some dwelling types to remain under the cap, but it also allowed them to increase their DCs for other dwelling types. In the two largest cities in the state, Brisbane and Gold Coast, the four year transition period that followed involved multiple different upwards and downwards revisions to DCs for different dwelling types, providing the natural variation that can be exploited to isolate the behavioural effect of DCs on prices and new dwelling supply.

Our results support the view of practitioners that DCs have no effect on dwelling prices. Our model estimates of the behavioural effect of

E-mail address: c.murray7@uq.edu.au.

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DCs on prices are zero. We also show the importance of our identification strategy by looking at the results of the same models in the absence of the surprise policy variation, showing that indeed, this reverses the sign of the estimated coefficient, as it now captures predominantly the mechanical covariation with dwelling value that DCs have by their construction (i.e. dwellings with more bedrooms have higher DCs and higher prices).

In terms of the effect of DCs on the quantity of new sales, our results show a slightly positive effect, with a dollar increase in DC associated with an extra new dwelling of that type every 1.9 years. This is consistent with other results, such as those of Burge and Ihlanfeldt (2006). However, there is currently no clear theoretical view in the literature that would support such results. It is shown that real options theory, so far ignored in the literature, provides the appropriate foundation that predicts such results, against common intuition.

2. Theoretical background

In the literature on the effect of DCs on property prices and rates of new construction (summarised in Table 5 of the Appendix), there are two major open debates. The first is a theoretical one, and it has had relatively little recent attention.

Consider the economic problem of a property developer. Prior to owning developable land, their first problem is to determine a bid price for the site. This involves subtracting estimated costs from revenue once developed to the highest and best use. All costs are subtracted from expected revenue, including government charges, construction costs, and selling costs, along with a risk adjusted profit margin, to determine the site value. At this point, the economic incidence of DCs is on the landowner, whose value is diminished by the charge, which all potential bidders will account for in their assessment of its value. It should have no effect on the assessment of the sales prices or volumes made by developers, which are all based on market assessments.

For a developer who owns land, this land is now a sunk cost, and additional charges cannot be 'passed back', as they are in the position of the landowner in the previous case. Their problem of profit maximisation simply changes to account for the additional DC costs as a function of the quantity of dwellings built, which may lower the optimal development density. Eq. (1) shows how the $-DC.q$ term enters the standard profit maximisation problem, reducing the optimal density due to the convexity of $C(q)$ and the resulting $-DC$ term in the optimality condition in Eq. (2) (which holds under convexity assumptions on $C(q)$).

$$\max_{\{q\}} \pi(p_0) = p_0 q - C(q) - DC.\, q \tag{1}$$

$$\frac{\partial \pi}{\partial q} = p_0 - \dot{C}(q) - DC. \tag{2}$$

In the absence of regulatory restrictions on density, which may negate this effect entirely[1], higher DCs reduce optimal building density on each site. However, this effect is not the same as reducing the rate of new housing supply on a per period of time basis. Intuitively, larger new buildings take longer to sell to the market than smaller ones. Reducing the total size of a building on any given site may not change the rate of new dwellings that meet the market in a given time period across the many potential sites in the market as a whole.

The dynamic problem of determining the rate of sale of new dwellings for any development, either pre-construction sales or post-construction sales, is a real options one. Because development sites contain the option to delay both construction and sales, the developer is faced with an optimal timing problem. We show the most simplified version of this problem for a developer who has already committed to a particular size of building in Eq. (3), where ϕ is the growth rate of price at the current time, p_0, and ρ is the discount rate, or the cost of waiting had each dwelling q been sold and the revenue gained at an earlier point in time. It is a present-value-of-revenue maximisation problem, with a control variable of the rate of flow of new sales, q_t, as in Eq. (3).

$$\max_{q_t} V_0(p_0) = \int_{t=0}^{\infty} (p_0 e^{\phi t} q_t) e^{-\rho t}. \tag{3}$$

This problem is solved by looking at the optimal strike time for a single sale of a new dwelling, q, which is the instantaneous rate q_t. For each q, whether this single sale occurs, or is delayed, depends on whether the cost of waiting ρ, exceeds the benefit of waiting, ϕ, with the following the expected outcomes.

$$\begin{aligned} &\text{If}\phi > \rho \;\Rightarrow\; \text{Delay} \\ &\text{If}\phi = \rho \;\Rightarrow\; \text{Indifferent} \\ &\text{If}\phi < \rho \;\Rightarrow \text{Sell now.} \end{aligned} \tag{4}$$

In the equilibrium, the second condition in Eq. (4) will hold, and the rate of supply of q will be adjusted by each participant in the market to ensure this is the case. Notice also that this result is true regardless of the size of a development, i.e. the total q of any given developer does not affect the rate at which they supply the market, even though the total quantity of new dwellings on any given site may vary according to the size of DC as per the optimal size decision from Eq. (1). A developer selling 100 dwellings will find it optimal to sell at the same rate as a developer with 10 dwellings, given market conditions. Neither has an incentive to bring forward sales and depress local prices, and both have an incentive to delay each sale if it increases the expected present value of their next sale. This is true regardless of any changes to costs, such a through increased or decreased DCs, or unforeseen changes to construction costs, as there are no costs in this maximisation problem. This real options element of the developer's problem supports the practitioner's view that DCs have economically benign effects in terms of overall rate of supply of new dwellings, though it may affect the distribution of dwellings on different sites where density restrictions are not binding. Such effects have been well-known for over three decades since Titman (1985). Ignoring the dynamic problem of a developer can lead to erroneous expectations of negative effects on total new dwelling quantity, and via this quantity effect (or through direct summation of costs) a potential effect of increasing prices.

A simple example will suffice to make clear the intuition in this theory. Table 1 shows the net present value of revenue from selling a single new dwelling in three scenarios with a discount rate, ρ, of 0.05 per period, that align with the conditions in Eq. (4).

Notice that in Scenario A, the rate of price growth exceeds the discount rate, and hence selling each new dwelling in a future period increases the present value of the project, and hence each sale will be delayed. In Scenario C, each sale will be brought forward, rather than delayed, increasing the rate of new supply to avoid lower present-value revenues by selling in a future period. The absolutely crucial lesson here is how the imposition of a DC, or increasing the DC amount, can turn Scenario A into Scenario C by reducing the net revenue from each future dwelling sale to a developer and bringing forward sales. For example, if a DC of $10,000 is announced to be imposed in the next financial year in Scenario A, it becomes Scenario C in net terms, and the developer will prefer to bring forward planning applications, to get a lower DC for that project, and incur sales in the current period.

It is exactly this result that was found by Burge and Ihlanfeldt (2006), whose data on Florida new dwelling construction showed the pattern of higher DCs being related to higher rates of new construction. Their explanation for this result, however, is that perhaps higher DCs somehow increase demand, and increase local government approvals for dwelling construction. Given that real options theory provides the core basis of land economics, it is surprising that this is the first time this theoretical picture has been brought to the academic debate on the effect of DCs on new housing prices and supply.

[1] In such cases the density limit q^* is less than the optimal q of Eq. (1), satisfying Eq. (2).