Reflections on the nature and policy implications of planning restrictions on housing supply

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Abstract Planning is about other things as well, but it is fundamentally an economic activity. It allocates a scarce resource, but independently of prices or any market information. In analysing the effects this allocative mechanism has on housing supply (or, indeed, the supply of buildings for any given use) we need to think carefully about what exactly it is that planning allocates and whether, in its operation, it creates a constraint on the supply of what it is allocating. In the British case, our planning system does not operate on the supply of housing directly, but indirectly via the constraint imposed on land supply. Given the income elasticity of demand for space, this has policy implications perhaps even more serious than is acknowledged by Barker (2008) in this issue.

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I. Introduction

Kate Barker in her, now, four reports (Barker, 2003, 2004, 2006*a*,*b*) has rendered all of us an extraordinary service. These reports brought a sharp economic policy focus to a previously almost wholly neglected issue but an issue of real importance. In addition, they brought together a huge and valuable body of analysis and evidence. They are a resource for both policy-makers and urban economists, not just in the UK but in the world at large. I have already cited them widely in policy analysis for China.

These Barker Reviews have changed the context within which planning is discussed and analysed, and the recommendations are already feeding through to influence policy. The analysis provided in the paper in this issue (Barker, 2008) is consistent with the body of the work embodied in the reviews, but focuses specifically on the issue of whether the inelasticity of supply of new housing in England is significantly related to the working of the English planning system, broadly defined.

A discussant's job is not to offer an undiluted paean of praise for a paper, but I would like to emphasize the importance of Barker's contribution and note my general agreement with the analysis presented here. I strongly agree that a system of land-use regulation is essential if for no other reason than the endemic problems of market failure associated with land markets, although I acknowledge that planning is about addressing more than just market failure. However, the problems of market failure

addressed by planning are endemic to land markets as a result of the particular characteristics of land. Because every parcel of land has a fixed location and significant transactions costs associated with it, owners or occupiers are locked into individual plots and their investments are illiquid. Moreover, their enjoyment of their rights of occupation are inevitably tied up with the actions of neighbouring plot occupants, and all parcels are different from all other parcels because of their particular location. A parcel's location determines consumption of a wide range of (local) public goods (such as less crime) and amenities (such as better views) available at specific locations, as well, of course, as driving the central motor of modern theories of urban land prices—accessibility to jobs.

As a result, there are important and particular forms of externalities and other potential forms of market failure. Because of the very large number of individuals involved, transactions costs for individual plot owners to combine or coordinate are typically large relative to individual effects, making Coasian solutions to resolving these problems of market failure difficult. Policy interventions in the form of fiscal measures and incentives have perhaps been under-explored, one suspects partly because of the relative lack of attention mainstream economics and the education of economists give to land. Partly as a result, perhaps, systems of land market regulation have tended to evolve more from a combination of the intellectual traditions of urban design and architectural and socialist planning, than from the traditions of market regulation more familiar to economists.

As I have argued elsewhere (Cheshire and Sheppard, 2002, 2004) not only does the fixed location of land lead to particular types of market failure, but it also generates important distributional effects, normally ignored. Consumption of a wide range of important goods and amenities, often thought to be provided free, is actually conditioned on individual incomes and wealth because the value of these attributes is capitalized into house prices. Thus, the ability to benefit from better schools or the amenities generated by land-use planning is determined by household income. As a result, amenity values generated by Green Belts differentially benefit richer house owners, producing an even more unequal distribution of welfare (measured as equivalent income) than the incomes of home owners themselves (Cheshire and Sheppard, 2002).

What needs to be recognized is that while planning is about other things as well, it is fundamentally an economic activity. Our planning system allocates a scarce resource—land for urban development—but without any regard for prices or any market information. In analysing the effects of this allocative mechanism on housing supply (or, indeed, the supply of buildings for any given use) we need to think carefully about what exactly it is that a particular planning system allocates and whether, in the allocative process, it creates a constraint on the supply of what it is allocating.

Understanding this, I think, is critical to understanding the different economic impact of different systems of land-market regulation (planning). Kate Barker cites the systems of Germany and the Netherlands, but let me also include that of the USA in the comparison with England's. I agree that the fundamental structure of England's planning system was set by the 1947 Act. This was in the then social and political context of a utopian effort to rebuild Britain's economic and social system on socialist

lines and reflected the still recent successful experience of state direction of a war economy. Economic as well as land-use planning were on the agenda, although it was land-use planning that was implemented.

Not only did the 1947 Act nationalize development rights, but it set certain policy objectives, particularly that of 'urban containment' (Hall *et al*., 1973). It established a system for allocating not numbers or square feet of housing or offices, but for allocating the area of developable land with the aim of deliberately restricting (for perceived social and environmental purposes) the spread of urban areas. Land allocation was converted into numbers of houses only by assuming fixed densities of development. As you would expect with a regulatory/planning system coming from the intellectual traditions that it did, it dealt in physical units and measures such as numbers of households, jobs, and densities, and it explicitly excluded any consideration of market signals or measures of market demand or supply. As planning practice has developed, price information has been deemed to be 'not a material consideration' for decision-making by planners, and so ignored. The current move to include measures of 'affordability' in land-supply decisions is the first attempt to include any market information in the planning process.

II. Some alternative systems of land-use planning

The Netherlands and Germany operate within a somewhat different system—the 'master plan' tradition. In this system there is very close control of what can be built on any site, but the developer can just get on and build it without seeking 'development permission'—so long as what they are building conforms to the requirements set down for the particular site. In Britain any change from the status quo legally defined as 'development'—which would include not just construction but changing the use of a shop from selling holidays to selling houses—is subject to 'development control' and needs individual planning permission. These systems are not so radically different as these descriptions suggest since there is, in a British context, a local plan and what is planned for a given area of land will influence the outcome of the development control process. But the structure of decision-making is different and the British system is arguably more open to political influence. A second more fundamental difference between planning in England and that in Germany or the Netherlands is the obligation on local governments in those countries to provide a supply of land for development. Historically, this has probably been most marked in the Netherlands although there has been growing political pressure for constraint of urban development over the past 10 years. In the Netherlands, one of the most important functions of local governments historically was land drainage (see Needham, 1992)—'producing land'.[1] This has continued to the present to influence attitudes to land so that, in the Netherlands, land supply is treated more as a utility, a necessary feature of life that it is the job of government to ensure is adequately supplied. Although it is the highest-density country of any size in Europe and a rich country too, housing in the Netherlands (as in Germany) is both of high quality and significantly cheaper relative to incomes than is the case in England. The most recent data in Statistics Sweden (2005) show new-build houses being 38 per cent larger in

[1] There have been increasing signs of change in the Netherlands since about 2000, with growing pressure to constrain development and establish urban containment policies.

the Netherlands and 40 per cent larger in Germany than in the UK. In the Netherlands the price per square metre was 45 per cent less than in the UK. No directly comparable price information is available for Germany but there (OECD, 2004) the real price of houses fell in both the 1980s and the 1990s and was completely stable over the whole period 1971–2002, compared to an annual percentage rate of increase in the UK of 3.6—the highest for any OECD country. Over the same 30-year period German real household disposable incomes increased at 2.6 per cent a year compared to 2.3 per cent in the Netherlands and 2.9 per cent in the UK (OECD, 2004). In the Netherlands real house prices rose during the 1970s, fell at an average rate of 2.2 per cent a year during the 1990s, but then rose sharply in the 1990s.

In England the overriding objective of policy has been urban containment (as has been developing in a few areas of the USA in recent years—see Phillips and Goodstein, 2000). This necessarily entails the restriction of the supply of urban land. Moreover, with our centralized fiscal system, local authorities have an effective fiscal disincentive to allow urban development. They have statutory obligations to provide services for new houses and residents, but with no direct return in their tax revenues since such a high proportion of local property taxes is subject to re-distribution by central government, and property taxes account for such a small proportion of local government revenues. Even though this system restricts the supply of land relative to demand, however, it is only an indirect restriction on the supply of (new) houses. It does not directly restrict the supply of dwellings.

In the USA the planning system is institutionally somewhat different again, since it is a zoning system. This gives the system something in common with the 'master planning system', but control of individual sites is substantially less detailed. There is a facet, however, which is something like the British system since it is possible, in principle, to get zoning waivers by applying to the local zoning board, but these are frequently politically impossible and are always expensive to obtain. If development conforms to the general requirements of the rules operating for a particular zone (and conforms to local building codes) it can go ahead. The decentralized fiscal system provides a strong incentive to allow commercial development, but some disincentive to allow denser residential development. Historically, these zoning powers have been used to restrict development for lower-income households by imposing high minimum lot size requirements and making subdivision of existing lots very expensive or impossible. New residential development, even in a high-housing-cost region such as the Boston metropolitan area, is with a mean lot size of an acre.

The real difference in economic terms between the US and British (and Dutch, German) systems, therefore, is that, with just some few exceptions such as Portland, the US system does not control the supply of land, it in effect controls the number of 'houses plus land' bundles by means of either minimum lot-size requirements or making subdivision of lots too expensive to occur. In the past, given the supply of land and the ability to develop new subdivisions on the edge of existing urban areas which then got their own zoning powers, this did not have significant effects on prices. It produced low-density leapfrogging development but it did not restrict the total supply of houses. As Glaeser *et al*. (2005) have shown, however, it has recently been increasingly constraining the supply of housing in the north-east and west coast regions as whole regions get 'built out' and existing communities become more restrictive. This seems to be happening, however, because of regionally differing

combinations of minimum lot sizes and the high costs—pecuniary and political—of getting zoning ordinance wavers to permit the subdivision of existing built lots. Housing land is there, but in large gardens and protected areas so it cannot be built on or developed at higher densities. Indeed, a striking finding of Glaeser and Gyourko (2003) is that the implicit price of additional garden space in parts of New England appeared to be negative, implying, if true, that house owners were being constrained to consume more land than they would choose to if left free to choose optimal 'house-land bundles'.

III. What happens if you control land supply?

This is the central point of my argument. Housing is a complex, indeed a very complex good, consisting of many attributes bundled into one composite good. This, of course, is the central insight of hedonic approaches to analysing house prices and housing markets, in wide application since the theoretical developments of Rosen (1974). There must now have been thousands of hedonic studies of housing markets and I would claim it is an interesting example of an area of economics in which there has been something very closely akin to 'scientific progress'. Data sets, statistical techniques, experience, and computing power have all progressed, so that the state-of-the-art studies are increasingly good and believable. They seem to me to show that housing market search processes and price determination are really very sophisticated and consistent with there being pretty good information and well-functioning markets. One recent development has been the insights gained from analysing the interaction effects of variables. Thus, Anderson and West (2006) find not one price for access to parks and open space in Minneapolis/St Paul, but a price which varies with the local density, with local incomes, demographic structure, and distance from the edge of the city. You can interpret this as implying that while the price of access to parks varies according to local conditions this is really because the housing attribute 'distance from open space' varies over the city according to how scarce space in gardens is, how scarce space at the edge of the city is, etc. Cheshire and Sheppard (2004) find that the capitalized price of given school quality varies with the suitability of a house to hold children and, moreover, evidence suggesting that it is not just current school quality that commands a price but expected school quality.

No credible hedonic study has been done that does not find that space internal to a house is not just a statistically significant variable but a highly influential variable in determining the overall price of a house. There are fewer studies which include garden or plot size as an attribute. Until the development of geographic information system (GIS) software and digitized maps, measuring the dimensions of gardens included with structures was a very labour-intensive task. Of the few studies before 2000 to include plot size, that by Jackson *et al*. (1984) was one of the earliest. This study found a significant price being paid for more garden space—a finding common to the great majority of studies which have included this attribute.[2]

Another difficulty with including garden size as an attribute is that underlying urban economic theory predicts there will not be a single price but that the price of

[2] The study of Glaeser and Gyourko (2003) was a form of hedonic. This found a positive price paid for gardens but a negative price paid for additional garden space over the mean garden size.

residential space will vary systematically with accessibility to jobs (commonly assumed to be concentrated in the centre of the city). Cheshire and Sheppard (2004), using the model defined in (1) below, not only found that the estimates of the rent function parameters were significant—implying that there was a statistically significant price being paid for (more) land with the price varying with both distance and direction from the city centre—but, in addition, for a given size of garden, a higher price was paid if it was nearer to square in shape, rather than long and narrow. These results provide strong evidence people get welfare from, and care about, space, in both houses and gardens. They pay more to consume more private space and so, implicitly, live at lower densities, all else equal. This result is consistent with Song and Knaap (2003) who again find a positive and significant price paid for houses built at lower density, all else equal.

$$\frac{P^{\psi}-1}{\psi} = K + \sum_{i \in D} \beta_i \cdot q_i + \sum_{j \in C} \beta_j \cdot \left(\frac{q_j^{\lambda_1}-1}{\lambda_1} \right) + \sum_{k \in E} \beta_k \cdot \left(\frac{q_k^{\lambda_2}-1}{\lambda_2} \right) + r(x,\theta)\frac{L^{\xi}-1}{\xi} \quad (1)$$

where:

P = sales price of structure
q_i, q_j q_k = structure, location, and education-specific characteristics
K, β_i, λ_i, ψ, ξ = parameters to be estimated
L = quantity of land included with structure
D = set of indices of characteristics which are dichotomous
C = set of indices of characteristics which are continuously variable
E = set of indices of characteristics measuring educational quality
$r(x,\theta)$ = land rent function given by:

$$r(x,\theta) = \beta_1 \cdot e^{x \cdot (\beta_2 + \beta_3 \cdot \mathbf{sin}(n \cdot \theta - \beta_4))} \quad (2)$$

where:
x = distance from the city centre
θ = angle of deflection from the city centre
n = number of 'ridges' in land value, representing radial asymmetries
β_i = estimated parameters of land value function

The logic of an hedonic approach to analysing house prices is that, since housing is a composite good, the total price of which is the aggregate of the prices of each individual attribute, we must think of separate demand and supply characteristics for each attribute. I would further argue that, even if we cannot at present identify these supply curves, it is useful to think about them in order to see what can be concluded about their likely form. The supply of some attributes, such as frontage on the river Thames or Hampstead Heath in London—may be in naturally fixed supply. There are a fixed number of houses that provide such frontage. The supply of other attributes may also be highly inelastic. If, for example, parents looking for educational quality seek, in fact, to get access not just to a good state school, but to the *best* state school in their housing market area, then the supply of educational quality will be highly inelastic. There can only be one best local school. Yet other attributes may be produced by a quasi-industrial process and so be elastic in supply. Examples might be central heating, fitted kitchens, or the number of rooms in a given total space. In the

absence of any land-market regulation, one would assume that the supply of urban land would be in more or less perfectly elastic supply. There would be a significant mark-up over agricultural land because of the costs of providing transport and other infrastructure, but such costs would be relatively constant in real terms, so more urban land could always be provided at a given price.

As shown in Cheshire and Sheppard (2005), this seems to be consistent with housing land price data for England and Wales from 1892 to about 1955. Between 1892 and the last pre-Second-World-War population census in 1931, there was a 61 per cent increase in household numbers and a 25 per cent increase in real household incomes, but no increase in the real price of housing land. Between 1955 and 2002 the real price of housing land increased 11.1-fold but real house prices increased only 3.4-fold, with nearly all that increase being since 1971.[3] The distinction between the English planning system and those of Germany, the Netherlands, and the USA that is particularly significant in economic terms is that the English system explicitly constrains the supply of land, and has done so over a long period. The German and Dutch systems of land-use planning, although they impose a strong regulatory framework, impose only a modest constraint on supply. And, as noted above, in the USA, the system, where it restricts supply, mainly restricts the supply of land-plus-housing bundles and has effectively done so only for a comparatively short time. The length of time a restriction is imposed is critical in the housing market because of the durability of buildings and the small size of the flow of new build relative to total supply or stock.

Given the composite character of housing we should, in principle, think not just of the characteristics of the supply of individual attributes, but also the structure of demand. Here there is some evidence (Cheshire and Sheppard, 1998, and Cheshire *et al*., 1999, for example) and this suggests that the demand for space in houses, and externally in gardens, is highly income elastic: evaluated at mean incomes, estimates for three different housing markets over three dates were typically around 1.6 for internal space and 1.75 for garden space.

IV. Policy implications

Conceptualizing the problem Barker poses in these terms seems to me to have implications even more uncomfortable than those in her conclusions. The demand for housing land is a derived demand, so our planning system only indirectly affects housing supply and the price of houses through its policy of containment and, more recently, densification. But household numbers—apart from being unreliable in their projection and so a poor tool for forecasting how many houses to build—would, even if known with perfect foresight, be only one factor in the relevant determinants of demand. If we are to provide stable house prices what we need to be able to predict is the effective demand for housing space and garden space, given that it is the quantity of land that the system allocates.

[3] 1980, the date in Kate Barker's figure at which the house price =100, was, in fact, a low point in the real house price cycle, so perhaps the figure tends to overstate the trend increase since that date.

Here what evidence we have is discouraging. In Cheshire *et al*. (1999) we built a 'microsimulation' model for the English housing market: microsimulation in that it was built up from individual data on observed house prices and the incomes of occupants. It was crude in that it involved grossing up from estimates of just three regional housing markets (Darlington, Nottingham, and Reading), but against that the stability of estimates of the structure of demand over time and across these markets was reassuring. The model allowed for induced household formation as house prices changed and for induced inter-regional migration. 'Houses' were almost truly quality-constant except for the assumption that densities would be constant at their current average. The purpose of the model was to estimate the impact on house prices not of housing numbers, but of housing land supply (possible because the demand for land was explicitly estimated and modelled). Demand for houses was as normally modelled—determined by household numbers and incomes and the structure of demand. It was an equilibrium model, so short-term effects of interest rates etc. were not accounted for.

The impact on house prices of any set of assumptions about changes in land supply, household numbers, or real incomes could be simulated, for England as a whole or disaggregated by region with different assumed values for different regions. Two such scenarios are worth reporting. Both of these were for the period 1996–2016 and applied the then recently announced planning policy of providing 60 per cent of new housing on brownfield land. They involved no differences in assumptions across regions. For modelling purposes, planning policy was interpreted as providing 60 per cent of any additional land within existing urban areas, with consequent increases in overall urban densities. Both scenarios applied the then projected increase in household numbers of 4.4m by 2016 (HMSO, 1996). Scenario 1, however, assumed no growth in real incomes over the period, while Scenario 2 assumed that real incomes grew by 25 per cent—consistent with the observed trend growth between 1986 and 1993. Household and income growth were assumed to be at the same rate in each region, although, as noted above, different values for each region could have been incorporated if desired. These two scenarios, although they embodied the same assumption about the brownfield/greenfield mix and about the growth in household numbers, produced remarkably different forecasts of real house price increases. With real incomes constant, the increase in real (quality-constant) house prices across England was 4.4 per cent; assuming real income growth at past trend rates produced a forecast increase of 131.9 per cent. Thus, in a world in which the supply of land is restricted, the real driver of real house prices seems to be income, not household numbers, and this stems from the income elasticity of demand for space.

V. Conclusions

Thus, while I largely support Barker's analysis, my conclusion with respect to the impact of the present system on housing affordability is more pessimistic. So long as we constrict the supply of land and the demand for space is as income elastic as it appears to be, projections of household numbers—even were they accurate—would be little help in guiding our system to improve housing affordability. Houses are not simple goods and demand is not just for quality-constant houses (something quite imperfectly measured in current house-price indicators) but for improving house quality, including more space. Such improvements in turn imply more land for

housing and, in the absence of such an increase in land supply but with rising incomes, average real house prices will continue to trend upwards. In turn, this implies a pressing need both to take much more explicit account of price signals in determining land supply and reassessing current policies of densification and Green Belts. Even stabilizing housing affordability is inconsistent with requiring 60 per cent of new residential development to be on brownfield land—especially in the high-demand housing markets with less brownfield space in southern England.

This does not imply a free-for-all for current non-urban land. As we both agree, there are good reasons for regulating land markets and where building occurs. Some non-urban land has high amenity or environmental value. Some, however, does not and policies with respect to such low amenity non-urban land, especially adjoining existing urban areas, need to be urgently reviewed.

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