SERC POLICY PAPER 4

Urban Containment, Housing Affordability and Price Stability - Irreconcilable Goals

Paul Cheshire (SERC and LSE)

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The planning goals of urban containment and now densification conceive of houses in terms of physical units and of land 'supply' as the area allocated for housing by the planning system; estimates of 'demand' are driven by household projections. Prices and price volatility are, however, determined by economic forces and there is a fatal mismatch between the operational concepts of demand and supply in markets and the parallel concepts with which the planning system works. Planning allocates a scarce resource – land – so is fundamentally an economic activity; but its decisions are made independently of price or market information. Moreover the concepts used by the planning systems vary with institutional arrangements and culture. Underlying these fatal clashes is the fact that housing is a complex good with many attributes, each of which is subject to particular supply and demand conditions and that one of the most important attributes of houses is space – both inside and around them. So the more planning systems attempt to densify development or to confine new housing to 'brownfield' land, the more inelastic supply of a vital housing attribute is, the more 'unaffordable' housing becomes and the more volatile housing markets will be. There are solutions - but none of them comfortable for policy makers.

I would like to thank many colleagues and former colleagues for their helpful comments. These include Stephen Sheppard with whom I have discussed and researched these ideas over many years, François Ortalo-Magnè, Christian Hilber and Henry Overman. I would also like to thank colleagues from CLG for useful comments. Despite this valuable input I am sure not all will agree with the conclusions and no doubt errors remain. I am solely responsible for these.

1 Introduction

Back in 2002 in its commentary on its new house-price survey *The Economist* wrote:

> "In the economic recovery…homes have done much more than shelter people from the wind and rain. They have helped shelter the whole world economy from deep recession."

The 'economic recovery' being referred to was from the dot.com bust. One could now expect to read something like that paragraph with the sense entirely inverted. It is easy to score points being right after the event. Many had fun at Andrew Oswald's expense when in 2002 he advised us to sell our houses because of the 'coming great housing crash of 2003-2005' (Oswald, 2002). My judgement was that he was more or less right, fundamentally, but we could have no faith in his forecast timing. What was needed to trigger a housing market crash was a nasty shock on the demand side and that was not in sight. That of course is why no one in their senses would take the advice of an economist about when to buy or sell assets. Economists may be well equipped to analyse the fundamentals but, when trading in assets, timing is of the essence. I advised investors in April 2003 (Cheshire, 2003) that housing land was not then a good buy but highly risky. They listened politely; and as Figure 1 shows, could still have had a real capital gain of 26 percent if they had ignored my advice and sold in late 2007. That does not compare to the real capital gain they would have made if they had bought in 1993, however, and sold 10 years later. As Table 1 shows, that gain would have been some 283 percent in real terms. But predicting turning points as compared to analysing fundamentals is, so far, beyond the wit of analytical technique.

The problem is that the fundamentals of the British housing market and of an increasing number of housing markets around the world are such that ever more violent booms and busts are inevitable while at the same time the long term trend is inevitably that houses will become less and less affordable. A further problem is that this is not really a 'fundamental' as an economist would conceive it. It is almost universally the result of the institutional and regulatory systems that policy has created to govern land and housing markets. A problem of market failure in land markets has engendered a problem of policy failure.

In Britain the regulatory system is still essentially as constructed by the Town and Country Planning Act in 1947. This was conceived in a world which believed in the efficiency and wisdom of state control of markets, had an idealistic vision of a benign socialism and was enthused with a commendable aspiration to build a better future. The resulting planning system is the last element of that period of post war reconstruction which has not been modified to take into account market realities. There have been many modifications since 1947 but the Act established an approach and framework that has not been superseded. The policy framework and aspirations it created derived from design and engineering intellectual traditions. Policy analysis and implementation is focused on physical units of housing, areas of land and densities of buildings and takes no notice of market signals or the real drivers of demand or supply. Indeed until 2007[1] decisions about housing numbers or the supply of any other category of real estate, were explicitly precluded from considering impacts of decisions on prices since prices were not a 'material consideration' within the statutory framework governing planning. Now, post-Barker (2004), at least the system is supposed to take into account the impact of plans on housing affordability. The British Planning system still ignores impacts on the cost of other types of real estate with the results analysed in Cheshire and Hilber (2008)[2].

[1] Following Barker 2004 Planning Policy Strategy 3 (PPS3) was published requiring planners to take account of the impact of their decisions with respect to proposed housing numbers on 'housing affordability'.

[2] Using data for more than 30 years and covering the main office locations of Britain, Western Europe and New York, this measured the impact on office costs of restrictions in supply imposed by land use regulations. The

It is worth remembering that as originally conceived the process of Town and Country Planning was intended to decant people from the high density slum conditions of large industrial cities and allow greener and lower density development in New Towns and city extensions. Early plans earmarked land to accommodate then expected population growth. Unfortunately – and it is very unfortunate as is explained below – no account was taken of increasing incomes on the demand for space and 'urban containment boundaries' (such as the original boundaries of Greenbelts or Areas of Outstanding Natural Beauty) largely reflected the transport realities, the incomes, the distribution of population and the ways of life as they existed in 1947 - two generations ago.

These boundaries tended to become ossified with the result that our landscape has become a palimpsest of overdrawn lines freezing the *status quo*. Great swathes of land at the edge of cities are impossible to develop because they are Greenbelt – 77.8 percent of the area of East Surrey – effectively a dormitory suburb of London (a third of the resident working population work in London) – is Greenbelt land. When today's planners look on maps to search out some potential areas they could designate for housing they find that almost everywhere is blocked from development for some reason or another. To this has been added the urgings of the 'densification' lobby (Rogers, 1999) so that the policy target now is for 60 percent of all new housing to be on so-called 'brownfield' sites. We now have a planning system directed to achieve precisely the opposite of what was originally conceived in 1947 – allow the mass of the urban population more space and a greener environment in which to live. It is little surprise that the supply of housing has become progressively more inelastic.

2 Elasticity of Supply and Price Volatility

It is straightforward to argue that the less elastic is supply of housing the more price volatility one should expect for a given change in demand. This, after all, is the basis of any definition of elasticity. As discussed in this section there is, however, somewhat more to say on the subject.

Price volatility is damaging for a number of reasons. It transfers asset values between groups. It creates financial instability, especially since house purchases are largely financed on credit – the origin of the current crisis in the financial system. It also makes monetary policy more difficult even for independent central bankers since it becomes increasingly difficult to ignore housing-market pressures rather than just for inflation targeting in setting monetary policy. Also booms and busts in house prices create oscillating wealth effects feeding through to consumption spending[3].

As Table 1 and Figure 1 show, the British housing market has been particularly subject to price volatility for the past generation. In a recent paper (Glaeser *et al*, 2008) analysed price volatility and its relationship to the elasticity of supply across 79 US metropolitan areas. During the cycle of the 1980s and early 1990s the most volatile of the 79 markets was Los Angeles, where real prices rose 67 percent from 1984 to the peak of 1989 and declined by 33 percent in the following five years. This was substantially less than the *average* for England of a 79.2 increase followed by a 37.6 percent fall. The boom in Britain from the 1995 trough to

impact of these on the cost of office space in UK locations was greater than anywhere else, with offices in the West End of London being the most restricted of all. Moreover costs imposed by supply restriction significantly increased following the imposition of the Uniform Business Rate (UBR). This was because the UBR transparently increased the fiscal disincentive to local communities to allow commercial development.

[3] Volume volatility also has its disadvantages since it will be associated with larger changes in employment. However, as the discussion of Glaeser et al., 2008 suggests, there may be offsetting effects if expectations of future prices (damped in more supply elastic markets) influence current demand since demand swings would be damped, too, in the more supply elastic markets.

the peak in 2007 was getting on for twice that of the previous cycle – an increase of 146.7 in real terms. We do not yet know how large in proportionate terms the subsequent fall will turn out to be.

Table 1: Price Volatility in English Housing and Housing Land Markets in Real Terms

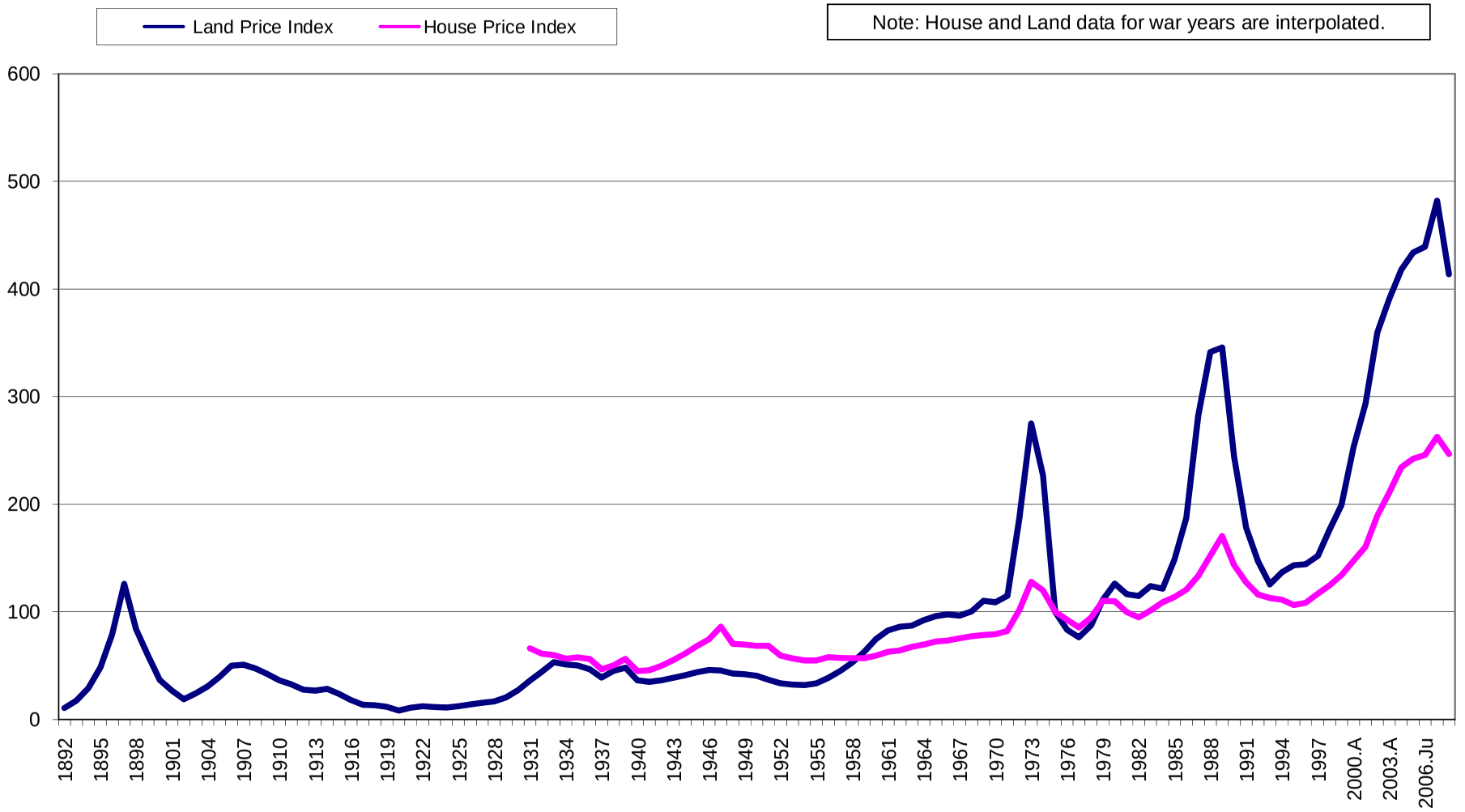
Trough-Peak	Real Price: 1975=100		% Change Trough-Peak		Peak-Trough Market House Completions 1975=100	
	Housing Land	Houses	Housing Land	Houses	Index	% Change
1982	114.8	95.1			75.2[a]	
1989	345.7	170.4	+208.0	+79.2	133.9 [a]	+78.1
1993/95[b]	125.4	106.5	-63.7	-37.6	88.7	-33.8
2007 July	480.7	262.7	+283.33	+146.7	115.7	+30.4

[a] Completions bottomed in 1981 and peaked in 1988
[b] Real land prices and construction bottomed out in 1993: house prices in 1995

Sources: As Figure 1 and House Completions, Table 2.6 CLG/NS 2008

Although they avoid a judgement as to whether recent housing cycles in the US have contained elements of a 'bubble' they produce a plausible model of housing market cycles in which expectations about future house prices in the local market and supply are endogenised.

Figure 1: Real Land & House Price Indices (1975 = 100)



Sources: Land Prices Vallis 1972a-c, Housing and Construction Statistics and Property Market Reports: House Prices – Table 502 Housing Statistics

As they argue, if expectations about the future levels of house prices influence the price people will pay at any time in the housing market then supply has to be endogenised in the model. If supply is less elastic then prices will rise proportionality more for any increase in demand which will feed back to expectations about future prices and so to current demand. This model produces some complexities since, in a number of cases, it generates two forces each operating in different directions and so it is not possible *a priori* to say which of the forces will be the stronger. For example if a 'bubble' (triggered, perhaps, by an increase in expected future prices in the market) starts in markets where supply is more elastic it will always be the case that more houses are built than in markets where supply is less elastic but the 'post-bubble' impact of supply elasticity on prices can go either way. On the one hand markets in which supply is more elastic will see more houses built in response to the 'bubble' induced increase in prices but on the other the impact of additional building on prices will be lower where housing supply is more elastic.

They do find two clear cut propositions, however. In any bubble that might arise, a key defining characteristic of which is that house prices rise significantly above the cost of construction including the costs of land, price increases will be greater in markets where supply is less elastic; and any bubbles will be shorter in duration and occur less often in markets in which supply is more elastic.

They then test these propositions against the evidence for the 79 markets using purely topographical indicators (to avoid any possibility of endogeneity[4]) as measures of the elasticity of supply and find that the evidence is not inconsistent with their model. To investigate the first proposition they divide the 79 markets into two at the median of their measure of supply elasticity. They find that in the 1984-89 boom house prices increased in real terms an average of 23.2 percent in the less elastic supply markets but only 5 percent in the more supply elastic markets. They then investigate the second proposition by looking at the length of booms in the more and less inelastic markets. In the post 1996 boom period the ratio of the real house price to the full cost of construction rose at least 20 percent above its 1996 level for an average of only 1.7 years in the most supply elastic one third of metropolitan areas but for an average of 4.1 years in the least elastic one third.

This evidence does not prove that there was or was not a bubble in some US housing market areas but does show that price volatility is closely related to the elasticity of supply of new housing and is not inconsistent with a model in which expectations about future house prices influence current demand and in which the supply side of the housing market is endogenised. When we compare this to the English housing market we find not only is the average price volatility in England greater than in the most extreme urban area market in the US but it has increased very substantially over time while the supply of new housing – as the last columns of Table 1 show - has become even more inelastic. A price increase in real terms between 1993 and 2007 1.85 times as large in percentage terms as in the previous boom produced an increase in building of only 38 percent of the previous increase. The peak of market construction in 2007 was only 86 percent of the level of construction of market housing averaged in each year of the 1960s. One of the main findings of Barker (2003) was how inelastic the supply response of house construction was in England and Wales. The evidence of Table 1 is simply further support for that view. The supply elasticity of construction is very low and has been falling. What are the reasons for this and what does a low elasticity of supply of new construction imply?

[4] This purely physical measure of the supply of buildable land – that is excluding land with a slope of more than 15 degrees and excluding ocean or large bodies of water - within a 50 km radius of a metro area turns out to be quite closely correlated with measures of regulatory restrictiveness.

3 How Does Land Use Planning Restrict Supply?

In this section I analyse the role of land use planning. The British system was identified by Barker (2003) as the primary source of Britain's housing supply inelasticity. But to understand the route by which our land use planning system or other systems of regulating land markets in use around the world may or may not constrain housing supply it is essential to understand the specifics of the system and the institutional and fiscal context within which a particular system operates. As in many cases the British system of land use regulation seems on close examination to be something of an international outlier.

Although planning addresses other issues as well, some system of land use planning or regulation is essential if for no other reason than the endemic problems of market failure associated with land markets. Problems of market failure 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 enjoyment of their rights of occupation is 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. There are, moreover, issues related to the supply of public goods, such as open land which also generate problems of market failure in land markets

Because of the very large number of individuals involved, transactions costs for individual plot owners to combine or co-ordinate are typically large relative to individual effects. This makes it costly for individuals to club together to purchase legal property rights to stop development on land where the wider social interest might be to conserve it as open space. This can happen – the National Trust is in effect an example – but is unlikely to provide a socially optimal solution to the problems of market failure[5]. Other types of economically based 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 have given to land.

As 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, actually is conditioned on individual incomes and wealth because the value of these attributes is capitalised into house prices. Thus, the ability to benefit from better schools or the amenities generated by land use planning is determined by household income. For example, the amenity values generated by Greenbelts differentially benefit richer house owners because the value of Greenbelt access is fully reflected in house prices. As a result only richer households can afford to purchase the flow of benefits that are associated with preserving the Greenbelt. The outcome - perhaps paradoxical to planners who are culturally egalitarian - is that the net effect seems to be that Greenbelts produce an even more unequal distribution of welfare (measured as equivalent income) than the incomes of home owners themselves (Cheshire and Sheppard, 2002).

Our planning system allocates a scarce resource – land for urban development – but, as noted in the introduction, without any regard for prices or other market information. In analysing the effects of this allocative mechanism on housing supply (or, indeed, the supply

[5] In the jargon of welfare economics Coasian solutions are unlikely to provide an optimal solution to resolving the problems of market failure.

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. The important point to stress is that the English[6] system of land use planning intentionally constrains the supply of land (not houses directly) and so only indirectly constrains the supply of housing. In this it differs from most other systems of land use control.

Understanding this is critical to understanding the different economic impact of different systems of land market regulation (planning). Let us briefly consider the systems of Germany, the Netherlands and the US in comparison with England's. As noted above the fundamental structure of England's planning system was set by the 1947 Act. Not only did this Act nationalise 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 of allocating the area of developable land with the aim of deliberately restricting (for perceived social and environmental purposes) the spread of existing urban areas while planning for free standing new towns. 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 engineering and design 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 post-Barker attempt to include measures of 'affordability' in land supply decisions is the first move to include any market information in the British planning process.

4 The Supply of Housing and Alternative Systems of Land Use Planning

This section explains some key differences – in economic terms – between four representative planning systems: the British, Dutch, German and US. All four regulate patterns of land use and have mechanisms to offset for the failures endemic in land markets, but with critically different effects on the supply (and quality) of housing. The Dutch and German systems, although superficially more rigid, are charged with supplying land sufficient to meet housing demand. In the US the zoning system makes it very difficult to subdivide existing built lots and in many areas imposes minimum lot sizes which to European eyes are extravagant: indeed even to US eyes where 10 acre minimum lot sizes are not uncommon such 'restrictions' seem extravagant. The result is that in those regions of the US where all suitable or available land has been zoned for development ('built-out') because of the extreme difficulty of redeveloping at higher densities, their zoning system is restricting the supply not of land as such but of 'house+land bundles'.

The Netherlands and Germany operate within a rather different planning tradition to the British – the Master plan. 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 build 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

[6] These comments and most of the data specifically relate to the English system but apply generally to the British system – exported to many of the ex-colonies of the British Empire. The adoption of a largely unmodified British system of planning, for example, explains both the appearance of Mumbai's skyline and why Mumbai now competes with London in offering the most expensive office space in the world.

holidays to selling houses[7] – is subject to 'development control' and needs individual planning permission. These systems are not so radically different as this description sounds since there is, in a British context, a local plan and what is planned for a given area of land will usually influence where and what is applied for and the outcome of the development control process. But the structure of decision making is different and recent research shows (see Ball and Allmendinger, 2008) the British system is slower, more subject to delay and more expensive to operate than a Master Plan system. It is arguably more open to political influence as well.

A second more fundamental difference between planning in England compared to 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 where historically one of the most important functions of local governments was land drainage (see Needham, 1992) – 'producing land'[8]. 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 which it is the job of government to ensure is adequately supplied. Although the highest density country of any size in Europe and a rich country too, housing in the Netherlands (and 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 were 38 percent larger in the Netherlands and 40 percent larger in Germany than in the UK. In the Netherlands the price per square metre was 45 percent 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 decades of the 1980s and 1990s and was completely stable over the whole period 1971 to 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 percent a year compared to 2.3 percent in the Netherlands and 2.9 percent in the UK (OECD, 2004). In the Netherlands real house prices rose during the 1970s, fell at an average rate of 2.2 percent a year during the 1980s but then rose sharply in the 1990s.

In England the overriding objective of planning policy has been 'urban containment' and more recently 'densification' There is now a target that 60 percent of all land for housing should be 'brownfield' land – that is land which has already been developed for some purpose (this aim has also been taking hold in a few areas of the US in recent years – see Phillips and Goodstein, 2000). This necessarily entails the restriction of the supply of urban land. Moreover, with our centralised fiscal system, local authorities who are the primary decision makers on development control, have an effective fiscal disincentive to permit urban development. They have statutory obligations to provide services for new houses and residents but almost no direct return to their tax revenues. Local Authorities raise very little – typically around 20 percent - of their revenues from local property taxes. Most revenues come from central government for whom Local Authorities in effect act as agents in delivering services. The structure of fiscal incentives is even more negative with respect to commercial property since with that all property tax goes to national revenues. Even though land use planning policies in combination with fiscal incentives restrict 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; just of the land on which they could be built.

In the US the planning system is institutionally somewhat different again, since it is a zoning system. This gives it 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

[7] It is important to understand this legal definition of development does not coincide with economic concepts of development. Land uses are legally separated into 'use categories' and any change – whether from agricultural to housing or housing to office use as well as a significant increase in a building's size, constitutes in a legal sense, 'development'. It is the distinction between categories of use and the allocation of land for specific categories which produces the extraordinary price discontinuities in land values analysed in Cheshire and Sheppard (2005).

[8] There have been increasing signs of change in the Netherlands since about 1990 with growing pressure to constrain development and establish urban containment policies – see Rouwendal and Van der Straaten (2008).

the local zoning board but such waivers, however, 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 decentralised US fiscal system provides a strong incentive to allow commercial development but some disincentive to allow denser residential development since poorer households (who can only afford to live at higher densities) tend to be seen as consuming relatively more local government services compared to their property tax contribution. Having larger minimum lot sizes is in effect a way of keeping poorer households out of the community. Not only have high minimum lot sizes been used to restrict development for lower income households but zoning has made subdivision of existing structures and of built lots very expensive or impossible for similar reasons. 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 Bay Area is judged to be built-out (Glaeser *et al*, 2005) but there are communities in Marin County where there are 60 acre minimum lot sizes[9].

The real difference in economic terms between the US and British (and Dutch or German) systems, therefore, is that, with just some few exceptions such as Portland, Oregon, the US system does not control the supply of land, it controls the number of house+land bundles by means of either minimum lot size requirements or making subdivision of lots too expensive to occur. In the past, given the extensive 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 supply elasticity or 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 particularly 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 waivers 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 have chosen to if left free to choose optimal 'house-land bundles'.

5 Doing it the British Way: Restricting the Supply of Land

Restricting the supply of land for housing does not directly restrict the supply of housing except in the most extreme circumstances – for example if combined with density and/or height restrictions on building. This section analyses what happens when – as in Britain – the supply of land is restricted and what this does to the elasticity of supply, price and price volatility of the different attributes of houses.

Analysing the effects of directly restricting the supply of housing land – as we do in Britain and have done now for two generations - is the central point of this paper. 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 over time there has been a striking improvement in their sophistication and the insights one can find in them. Data sets, statistical techniques, experience and computing power

[9] Introduced in the early 1970s ostensibly to maintain dairy farming, although, effectively preventing low income – even moderate income – residential development.

have all progressed so that the state of the art studies are increasingly good and believable. They seem 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.

Hedonic Evidence for Housing Market Equilibrium

One recent development has been the insights gained from analysing the interaction effects of variables. Anderson and West (2006), for example, find not one attribute price for more open land in a neighbourhood but a price which varies with the local density, with local incomes, demographic structure, type of open space and distance a house is 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. Analogously Cheshire and Sheppard (2004) find that the capitalised price of given school quality varies with the suitability of a house to hold children and, moreover, with measures of the risk that currently indicated quality would be maintained. This suggests that the underlying attribute people were willing to pay for was the *expected future value* of the attribute rather than just its *current* value.

Of the physical attributes of housing the most important in terms of prices is the amount of space a house provides: and space not just internal to the house but also externally in the form of garden size. Indeed 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 highly influential 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 GIS software and digitised 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 found a significant price being paid for more garden space – a finding common to the great majority of studies which have included this attribute[10].

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 residential space will vary systematically with accessibility to jobs (commonly assumed to be concentrated in the centre of the city). Cheshire and Sheppard (2004), not only found that garden space commanded a significant price but estimated a rent function. This showed 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 squarer 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 (2004) who again find a positive and significant price paid for houses built at lower density, all else equal.

The logic of a 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. Furthermore, even if we cannot presently identify these individual attribute 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 a view over

[10] The study of Glaeser and Gyourko (2003) was a form of hedonic analysis. This found a positive price paid for gardens but a negative price paid for additional garden space over the mean garden size. In Britain, Day et al, (2006), find evidence that garden size is important.

Hampstead Heath in London - may be naturally in fixed supply. There are a fixed number of houses that provide such frontage or views. The supply of other attributes may also be highly inelastic. If, for example, parents looking for educational quality in fact seek to get access to not just 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 or binding topographical constraints, one would assume that the supply of urban land would be in more or less perfectly elastic. There would be a significant mark-up over agricultural land at the edge of the urban area 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. This is consistent with the findings of Glaeser *et al* (2008) who found that in the elastic supply markets house prices seldom deviated significantly from the estimated minimum profitable production costs. These were defined as building costs, land and land assembly costs and a normal profit. Land costs were assumed to be a constant 20 percent of the total cost of a house: that is land prices were invariant with numbers of house built except in so far as building costs increased with output in a market.

This is also consistent with the evidence from Figure 1 which shows an index of real housing land prices for England and Wales from 1892 to 2008. From 1892 to about 1955 there was no systematic trend in real housing land prices. Between 1892 and the last pre-WWII population census in 1931, there was a 61% increase in household numbers and a 25% increase in real household incomes, but no increase in the real price of housing land. Between 1955 and 2008 the real price of housing land increased by a factor of 12.3 but real house prices increased only by 4.5 with nearly all that increase being since 1971. In economic terms the distinctive difference between the English planning system and those of Germany, the Netherlands and the US is that the English system explicitly constrains the supply of land, and has done so over a long period. The German and Dutch systems, although they impose a strong regulatory framework, have imposed only a modest constraint on land supply (although as noted above the Dutch seem to have become more restrictive since about 1990). And as noted above, in the US, the system, where it restricts supply, mainly restricts the supply of land+housing bundles and compared to Britain has 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; 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.

6 People Like More Space: Policy Implications

In this section I briefly analyse the consequences for house prices and affordability of the policy imposed restriction on the supply of urban land and the findings that people have strong preferences for space - both for bigger houses and for bigger gardens - and as their real incomes rise they attempt to exercise those preferences by buying the sorts of houses that suit them.

Conceptualising the problem in these terms has very uncomfortable implications for policy makers. 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 policies 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 prices for a given quality of housing and are to do so via a 'planning' system rather than just by a regulated market with some government provision for low income housing, then what we need to predict is the effective demand for housing and garden space given that it is the quantity of land that the system allocates. Then we have to allocate not just that quantity of land predicted as being compatible with price stability but more. Not all the land allocated as available for development will actually be developed. One rule of thumb suggested (Evans and Hartwich, 2006) is that this implies allocating 40 percent more land than the estimated demand indicates is needed.

With respect to the drivers of effective demand for housing land what evidence we have is from the perspective of the current planning system even more 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 sub 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. All the estimates of the structure of demand told effectively the same story: there was a strong and stable income elasticity of demand that varied very little between the three markets or over time. What the model implied was that the overwhelmingly more important driver of the demand for 'housing' was not household numbers: it was rising real incomes. But of course in traditional planning processes the key determinant of how much land needs to be released for housing is, projections of household numbers. Changes in real incomes are ignored.

Our microsimulation model allowed for induced household formation as house prices changed and for induced interregional migration. 'Houses' were almost truly quality-constant except for the assumption that densities would be constant at their current average. The present planning system 'plans' for the number of houses to be allowed. The purpose of the microsimulation model was to estimate the impact on house prices not of allowing different numbers of houses – how many houses were built at constant densities - but of allocation varying quantities of housing land – how much land was designated as available for building houses on. The model made it possible to simulate the impact of land supply on house prices because the demand for land was explicitly estimated and modelled. So, since densities were assumed to be constant at the observed mean, as household numbers or incomes varied, we could estimate the impact on land prices of any given supply of land. Land supply was assumed to be determined by the planning system. 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 simulation results are worth reporting. Both of these were for the period 1996 to 2016 and applied the then recently announced planning policy of providing 60% of new housing on 'Brownfield' land. For modelling purposes this was implemented by assuming 60% of any additional land designated for housing was within existing urban areas, with consequent increases in overall urban densities. Both simulations applied the then projected increase in household numbers of 4.4 million by 2016 (HMSO, 1997). Simulation 1, however, assumed no growth in real incomes over the period while Simulation 2 assumed real incomes grew by 25% - 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 simulations, 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. If real incomes were set to be constant, the increase in real (quality-constant) house prices across England was 4.4% over the whole 20 year period. But if it was assumed real income grew at past trend rates then the model forecast an increase in quality constant house prices of 131.9%. Thus in a world in which the supply of land is restricted, the real driver of real house price inflation seems to be income growth not growth in household numbers. This stems from the strong income elasticity of demand for space.

7 Conclusions

The conclusion with respect to the impact of the present system on housing affordability and price stability is, therefore, extremely 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, maintain the quality of housing or dampen price volatility. 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. A central component in 'improving quality' is more space. Such improvements in turn imply more land for housing and, in the absence of such an increase in land supply but rising incomes, average real house prices will continue to trend upwards.

It is unpopular and difficult to confront the dilemma posed in this paper but the irreconcilable conflict between current planning policies and underlying economic forces – the fundamentals – means we are faced with three unpalatable policy choices. We could try to live with housing markets becoming ever more volatile and housing of a given quality becoming ever more unaffordable with the very undesirable distributional consequences this would have quite apart from the implications for future financial and economic stability.

The second choice would be rigorously to follow the logic of 1947 state planning. If we are intent on allocating land for each use without regard to price then logically we need to introduce space rationing. If price does not determine the supply of land then price must not determine its consumption. Each adult could, for example, have a ration of say 40 sq metres with dependent children having, say, another 20 sq metres each. We could, if we wanted, even introduce a trading system so young adults or those willing to live in more cramped conditions could sell some of their space ration perhaps buying back space in later life. This would be in some sense inequitable but very much less inequitable than the outcome of the present system.

The third possible policy choice would be to modify our system of land use regulation so that it takes explicit account of price signals in determining land supply. As argued in Cheshire and Sheppard (2005) an elegant way of doing this would be to use the differential in the price of land with and without planning permission as a trigger to release land unless the social or amenity value of the land in its existing use exceeded the price differential[11]. While it might be difficult to agree precisely what the amenity value of undeveloped land was in all circumstances, the evidence is clear that for very large areas of intensive farmland – see, for example, Barker (2004) Table 2.1 - the amenity value cannot possibly exceed its value in gardens so that land for development would be readily available in more than adequate quantities. This would obviously mean reassessing current policies of densification and the boundaries of existing protected land and it would mean looking systematically at the public values generated by maintaining present designations. What it would emphatically not mean

[11] This would mean we could exercise any social value attached to restricting the conversion of agricultural land to urban use just by allowing some continuing threshold value of land price discontinuities at the margin of urban areas. Such a price discontinuity could even be allowed to vary regionally depending on local tastes for more agricultural land.

is ‘concreting over Britain’. Even if the total area of towns and cities increased by half (sufficient effectively to eliminate land scarcity according to the estimates of Cheshire and Sheppard, 2002) still their total area would be only about that of Greenbelts now. While perceptions of the majority of people are that half or more of England is developed the actual figure is about 10 percent. Even in the ‘overcrowded’ South East it is only 12.2 percent (Barker, 2006b). The area covered by existing English Greenbelts alone is about one and a half times the total area of England’s urban areas.

The purpose of these reforms should not imply a free for all for development on current non-urban land. As discussed above there are good reasons for regulating land markets and for policy to control where building occurs. An additional possible reason for being concerned with urban densities might be if clear evidence appeared demonstrating lower densities contributed to a higher carbon footprint. The way to resolve that problem – if it exists – would be to impose an appropriate carbon tax, a strong case for which exists anyway. Trying to reduce carbon release indirectly by using an opaque set of regulations which only determine patterns of new development (a very small fraction of total development), is not likely to resolve any contribution the density of the built environment may make to overall carbon use; as well as continuing to have the serious impact on housing markets identified in this paper. Indeed, it is very probable the Greenbelt and town centre first policies in fact tend to increase carbon emissions. They intentionally extend commuting trips since workers have to cross the Greenbelt and they separate people who are increasing dispersed from shops thus increasing shopping trips.

More obviously some non-urban land has high amenity or environmental value and the public interest would be served by safeguarding it from development. One of the ironies is that this in fact applies to some ‘brownfield’ land such as the extensive grounds of 19th Century hospitals. Much intensively farmed agricultural land with little public access, however, has negligible value beyond its value for producing food fully reflected in its market price. Policies with respect to such low amenity non-urban land, especially adjoining existing urban areas, need to be urgently reviewed. Given the implausibility and unlikely acceptability of space rationing, the alternative is inevitably long term deteriorating housing affordability coupled with an increasing volatility of prices and a rising risk of future financial hazard. Because of the small flow of new housing relative to the stock any policy change takes a long time to have an effect. Unless quite radical reforms to our method of determining how much land to release for development are implemented very soon we can look forward to a new house price boom starting in 3 to 5 years with a collapse – from a higher peak of unaffordability – inevitably arriving but with unforecastable timing at some date to be arranged.

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Spatial Economics Research Centre (SERC)
London School of Economics
Houghton Street
London WC2A 2AE

Tel: 020 7852 3565
Fax: 020 7955 6848
Web: www.spatialeconomics.ac.uk

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