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Urban Stud 2003; 40; 953

DOI: 10.1080/0042098032000074263

The online version of this article can be found at:
http://usj.sagepub.com/cgi/content/abstract/40/5-6/953
Land-use Planning and the Housing Market: A Comparative Review of the UK and the USA

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[Paper received, October 2002; in final form, December 2002]

Summary. This paper provides a review of some of the key articles and research examining the relationship between planning regulation and its impact on the housing market in the UK and the US. In both countries, demographic change coupled with economic growth has increased demand for housing units and in the UK, over 4 million new units are estimated to be needed by 2016. Given these pressures, the interaction of the planning system and the housing market is critical. The articles reviewed below mainly adopt a mainstream economics approach to modelling the impact of planning on housing markets. They are concerned with outcomes. An additional or alternative approach is provided by behavioural analyses of the relationship between planning and housing development. These enable the more complex interactions to come to light. This paper indicates the differences that exist between the UK and US planning approaches; however, in both countries, planning constraints are seen to raise price, reduce supply, increase density and, in the UK at least, reduce choice. However, planning is also seen to provide certainty and reduce risk. Of key interest is the price elasticity of supply of housing. Post-war estimates suggest a value for the long-run elasticity to be between 0 and 1 for the UK, and 6 to 13 for the US.

1. Introduction

Demographic change, lifestyle choice and economic growth have all increased household formation rates. At the same time, concerns about the state of the environment have become more important. Against this background, there have been concerns that the housing market may not meet the need for new homes and that price increases will have adverse effects upon the economy. For example, the market has been seen to fail to provide affordable homes for key workers in high-price areas.

In such an imperfect market, there has been a role for government intervention, although this may have positive or negative effects. This intervention has largely been in terms of planning. In order to protect the natural environment and to avoid uncontrolled development, new housing can only occur subject to planning approval. Also, as industrial restructuring has left vacant and derelict land in many cities, urban regeneration has become important in government policy and attracting new housing development to ‘brownfield’ land has been given a central place with targets being set for the proportion of new development allocated between brownfield and greenfield sites.
The impact of public policy on land and property markets is the subject of much interest and research. Many aspects of fiscal and regulatory policy impinge upon and affect markets in property and housing. However, it is the planning system in its various guises that has the most significant impact and it is planning that is the focus of this paper. Despite recent moves in the UK towards devolution of government functions, planning still remains a largely centralised and uniform activity in all parts of the country (Allmendinger, 2001). Significant power still rests with central (Westminster) government to shape the policies and macro-level trajectories of planning in the UK (Allmendinger et al., forthcoming).

The very hierarchical nature of development planning in the UK means that a ‘trickle-down’ of central policy through regional planning guidance, structure and local/unitary development plans provides a high degree of consistency in the planning policy framework. However, this somewhat strict ‘top–down’ approach to policy coordination in the UK is accompanied by a highly discretionary approach to development control. Local planning authorities (LPAs) (usually the district or unitary authority) have significant autonomy to interpret the policy framework in the light of local circumstances when making decisions on individual development proposals or applications. Although this discretion is tempered somewhat by the requirement that the local development plan is the main consideration in determining development proposals, this system differs fundamentally from the prescriptive zoning approaches found in continental Europe and the US.

As Cullingworth (1997, p. 17) points out, land-use planning in the US is largely a local matter. The implication of this is that there is great variety in the ways in which planning is carried out. In some areas there is virtually no planning or regulation, while in others there are approaches that are extremely sophisticated and complex. Thus, the centralised control characteristic of UK planning is clearly absent in the US. Partly, this derives from the federal system of government which mitigates against central control. But the lack of a general approach or system also derives from the attitude to property in the US, summed up in the Fifth Amendment to the Constitution which states that:

No person shall be … deprived of life, liberty or property without due process of law; nor shall private property be taken without just compensation.

The discretion in the US system is what sort of system, if any, to have.

Where control of development is undertaken, it is normally (although by no means always) through a combination of plan and zoning ordnance. There is separation of functions with the ordinance passed by the relevant elected municipality while decisions on zoning are taken by an independent body or commission. In theory, discretion on zoning is severely limited, although in practice the courts have increasingly been used to challenge zoning decisions and the policies upon which they are based (Mandelker, 1993). Thus, the UK and US have different systems of planning regulation, although similar policy concerns including regeneration in declining cities and regions and housing and associated provision in areas of growth (Kayden, 2001). The main focus of this paper is to assess how both systems of planning control interact with and affect the housing market.

A major literature has developed in both the UK and the US, examining the impact of planning policy on the housing market. The emerging consensus from this research points to planning restrictions raising house prices, although some authors suggest that US zoning is seen as a positive attribute that commands a price (Speyrer, 1989). Such policies are important since they affect price, output, location, density and quality of housing development. They may well have benefits as well as costs, providing public amenities that might otherwise not exist. This review article provides a comparison of UK and US research that has previously not been examined in detail.
The authors’ on-going research\(^2\) has highlighted the role and significance of fiscal controls and incentives, public plans and strategies, and ‘coalition-building’ as mechanisms through which public bodies can influence land and property markets. However, it is the regulatory role of planning through development control or zoning that has the most significant impact on such markets and it is that form of control that is the focus of this paper. The review will be concerned with, as Evans describes, “the secondary, and usually unforeseen, effects of government intervention” (Evans, 1999, p. 1639). Elements of difference and commonality will be explored and theoretical approaches and empirical results will be examined. This will permit an analysis of deductive modelling techniques that usually focus on outputs and on behavioural or institutional approaches that are more concerned with the processes by which outputs are generated. One of the benefits of this latter approach is that it can provide insights into elements missed by comparative static analysis.

The research examined has been conducted against a background of change in planning systems and objectives. In the UK, for example, post-war policy has supported greenfield housing development although recently there has been a shift towards brownfield development targets. In the US, with a lower average population density, there has been a growing concern, in some areas, regarding the environmental impact of growth and growth controls have emerged (Bramley, 2002).

In both the UK and the US, the question of how to measure planning policy or restraint has been an issue of debate, given the complexity of the systems. This paper specifically examines US zoning and UK development control which are the systems by which proposals for development control are regulated and determined. In the review presented below, housing market impacts of planning intervention as indicated by price, quantity, quality and density measures will be discussed, although the main focus will be on price and quantity.

The paper is structured as follows. Section 2 provides an overview of the policy framework in the US and the UK, providing an examination of changes over time, spatial impacts and housing impacts of policy. Section 3, examines theoretical approaches in the literature. Section 4 discusses the empirical results of planning restrictions on price, quantity and density. Section 5 provides conclusions and areas for future research.

2. Policy Framework in the UK and the US

In the UK, the government can influence the housing market in a number of ways. In the past, it has given tax advantages to owner-occupation. These still exist in that capital gains are untaxed\(^3\) although mortgage interest relief has been abolished (Hendershott and White, 2000). Government policy has also led to an increased role for the private sector and less public provision of housing while at the same time financial deregulation has enabled households to borrow more readily against housing wealth (see Gibb et al., 1999) and have higher loan–value ratios when purchasing property.

UK planning policy functions are framed within the development plan system. The ‘development plan’ comprises a strategic-level structure plan within which are a number of local/unitary development plans which translate and interpret strategic policy into site-specific allocations for land.\(^4\) In relation to housing, “the objective for local planning authorities is to plan to meet the housing requirements of the whole community” (Adams and Watkins, 2002, p. 97). This latter point refers to the need to consider issues of affordability, design, mix of type and location.

The objectives for local authorities translate into a requirement to provide sufficient housing land, while giving priority to the reuse of previously developed land within urban areas … in preference to using greenfield sites (Adams and Watkins, 2002, p. 97).
The development plan must have regard to national planning policy. Current policy seeks, *inter alia*, to promote urban regeneration, environmental conservation and quality-of-life improvements (ODPM, 2002; Scottish Executive, 2002). Such objectives impact upon the planning system’s requirement of identifying housing land supply. The amount of land needed for housing is estimated based upon demand-side factors including population forecasts and information on household formation rates. This is then compared against supply of existing stock and land already with planning permission.

Recent changes have downgraded the role of household projections, moving away from the ‘predict and provide’ approach previously adopted. In England, the preparation of a Regional Planning Guidance (RPG) statement is now required. This should take account of environmental considerations, the existing housing stock, past supply and land availability. RPGs thus set the context for development plans and local authorities need to take account of RPGs in the preparation of the development plan. There are also new powers for central government to intervene when local authorities release insufficient quantities of land to meet expected housing need.

In the US, there is an absence of national land-use planning policy as described above. There are, however, some common challenges facing urban areas across the US which echo concerns in the UK. A declining rate of growth in productivity, static real median household incomes, declining manufacturing and growing service-sector employment have all impacted (although unequally) on urban areas in the US (Teitz, 1996). A number of common policy themes or objectives have emerged as a result, including recognition of the need to increase development densities, re-use brownfield land in urban areas, restrict urban sprawl and co-ordinate transport and land-use developments. Unlike the UK, such policy objectives vary across the US and in their relationship to comprehensive plans and zoning ordinances. A number of models or approaches are emerging (Kayden, 2001, pp. 57–58).

— **State-level planning or plans**: either strategic plans with broad goals or a land-use plan which covers the state.

— **Local plan preparation requirements**: requires local government to prepare comprehensive plans and include sections on certain issues such as affordable housing. Can include financial incentives to prepare and be linked to grants.

— **Consistency and review requirements**: integration of plans and strategies at different governmental levels.

— **Concurrency requirements**: requiring infrastructure that will help to ensure the co-ordination of developments in a particular area.

— **Urban growth boundaries**: laws that may delimit areas of growth.

— **Areas of critical state concern**: laws which may identify areas of environmental concern or protection.

— **Developments of regional impacts**: laws requiring developments over certain sizes to undergo regional reviews.

— **Regional plans and planning agencies**: moves to set up a regional planning agency with the powers to prepare plans and regulate land uses over areas covering more than one local government jurisdiction.

— **Horizontal intergovernmental agreements**: laws requiring co-operation between different local governments.

— **Fair-share housing**: laws requiring localities to allocate housing to ensure even pressures and provision for all income classes.

This variation in approach means that it is difficult to generalise about housing policy *per se* in the US. This variation in turn could be seen as a reflection of the nature of planning in the US, with an absence of national policy guidance, although this latter may be changing as awareness of environmental impacts has increased. A number of states have adopted legislation that seeks to restrict suburban growth for reasons of environmental protection (for example, Vermont, Hawaii, Oregon) or to restrict urban sprawl (for ex-
ample, Washington, New Jersey, California). At the local or municipal level, zoning and sub-division are still the major determinants of housing allocations (Haar, 1996) although other controls are also available, again, depending upon the state or municipality (Cullingworth, 1997).

What is clear is that US and UK planning have institutionally different responses to similar pressures. Against such pressures, it is interesting to note that planning and planning making are becoming more sophisticated and accepted. It is also significant that the scope of such plans and their complexity are also increasing. It can be concluded that land-use regulation in both countries is experiencing a resurgence and a greater understanding of planning’s significance in land and property markets in general and housing markets in particular is therefore necessary.

3. Conceptualising the Relationships

This section of the paper will examine the impact of land-use policy on the housing market in the UK and the US. In the past decade, attempts have been made to estimate the impact of planning restrictions on house prices, output volumes, density of development and quality available to consumers. Given the different planning regimes in the UK and the US, the focus of research has been slightly different, although there are areas where the theoretical and methodological perspectives have been similar. Below, some of the seminal contributions to the debate are reviewed.

Before undertaking this review, however, it is useful to examine the methodologies of the approaches adopted. Many of the articles covered could be considered to have adopted a neo-classical approach. This approach, broadly speaking, embodies the notion that markets adjust to remove disequilibrium between demand and supply, and that this adjustment occurs rapidly. In property markets, there is the realisation that such adjustment may not be so rapid. Nevertheless, most authors accept that markets do try to respond to imbalances and, hence, in terms of methodological approach, these authors “form part of the mainstream” (Ball, 1998). Therefore, in what follows, these approaches are referred to as ‘mainstream’. In much of the discussion to follow, this type of approach is associated with econometric analysis where there is a concern for ‘outcomes’. This does not consider how these outcomes are produced. Within housing markets, such processes are of importance given the nature of the house-building industry and its interaction with the planning system for land provision and also the nature of site acquisition where multiple ownership can affect costs, profits and hence quantities supplied (Adams et al., 2001).

As an attempt to address some of these issues, behavioural approaches are also adopted by some of the authors discussed below. Ball (1998) argues that behavioural theories form part of an institutional analysis. Hence the term ‘behavioural’ rather than ‘institutional’ is used to refer to these approaches below. However, it is also worth noting that the behavioural approaches reviewed here are in many ways complementary to mainstream economic analysis.

UK Literature

In the UK, perhaps the paper using approaches most similar to those adopted in the US, is that by Cheshire and Sheppard (1995). The authors adopt a hedonic methodology controlling for both housing and neighbourhood characteristics including land-use patterns. The authors state that

These latter [land-use variables] prove to be important explanatory factors in their own right [and] have been formulated in ways designed directly to reflect the ‘outputs’ of the British land-use planning system (Cheshire and Sheppard, 1995, p. 248).

They apply their hedonic model to two British cities, Reading and Darlington, which face relatively high and low demand respectively. The authors argue that if they capture all the relevant hedonic variables affecting
house price, then their results should be consistent with the monocentric city theories.

Recent work by Bramley (1993a, 1993b) and Bramley and Watkins (1996) has also sought to examine the impact of planning regulations on housing output and prices. A key issue here and in other work (for example, Pryce, 1999) has been the relatively inelastic supply response by the housebuilding industry. This is not only a feature of densely populated areas such as the South East, but it has also been found to extend to more northern regions (Meen et al., 2001). For example, Malpezzi (1996), using time-series data, estimates long-run UK supply elasticity to be between 0.9 and 2.1. Bramley (1993a, 1993b) suggests that the UK price elasticity of supply is between 0.58 and 1.03 for 1988 and 1992 respectively.

Bramley employs a modelling framework in which house prices are written as a function of planning and other variables. The responsiveness to the market is also examined. One of the issues here is the discretionary nature of the British planning system which is argued to increase uncertainty for developers. It is argued that there is an ‘implementation gap’, since actual planning permission may not be given to land provided under the plan.

Bramley (1993a, 1993b) constructs a cross-sectional data-set at a highly disaggregated level—namely, that of the local authority district level. Ninety local authorities in England are covered, most of which are located in the West Midlands and that part of the South West closest to the South East. Bramley argues that these districts map onto local housing market areas which may be seen as an attempt to account for the existence of functional housing sub-markets. Data used include house price, housing supply, demographic, economic and geographical variables. These data cover the time-period 1986–88, a period of accelerating house prices.

The model assumes that markets can clear within one year while output is a function of current and expected prices and profitability and expected land supply, which is land with planning permission. The housing market is modelled in terms of housing units rather than considering the flow of housing services which is common in other literature (Alonso, 1964; Muth, 1969). Planning policy is an exogenous variable although planning decisions are also seen to reflect market conditions. The land market itself is endogenous with land price seen as the difference between house price and construction cost—in other words, fitting the standard residual valuation technique.

The methodological approach is consistent with mainstream economics and the approach to measuring the impact of planning policy is embedded within ‘mainstream’ econometric theory. The nature of the data-set and the incorporation of planning variables are, however, unique. The model differs from macroeconomic analyses of regional and national housing markets in the UK. These models use time-series data, are of a long-run nature (although can allow for short-run disequilibria), and are not concerned with spatial coverage (see Meen and Andrew, 1998, for an in-depth review of these models).

Bramley (1993a, 1993b) writes his model in five equations. The first is the demand equation which is written as follows

\[ P_j = P[Q_j, D_s(Y_j, G_j, Z_j), D_L(H_j, E_j, Q_{aj}, T_L)] \] (1)

where, \( j \) refers to the district; \( Q \) is output of housing units; \( D_s(.) \) is the structural demand function; \( D_L(.) \) is the local district demand function; \( H \) and \( E \) are vectors of demographic and employment variables respectively; \( Y \) is household income; \( Q_{aj} \) measures social rented housing supply; \( G \) is a vector of locational attributes; \( Z \) is a vector of social characteristics; and \( T \) represents local taxes.

While the impact of output on price is related to local price elasticity of demand, the openness of the system implies that effects can be felt in adjacent areas. The ‘global’ effect of output on price in this model is written as
\[
\frac{\Delta P_N}{P} = \frac{\Sigma \Delta Q}{\Sigma (Q_n + Q_s)} - \frac{\Delta P_L}{p}
\]

where, \(Q_n\) and \(Q_s\) are new and second-hand supply respectively. The supply function is written as

\[
Q_j = S_{-1}\{[P_j - C(W_j, U_j, G_j, N_j/A_j)], L_{dj}, L_{cj}, L_{pj}\}
\]

where, \(S_{-1}\) refers to a function of lagged values of variables; \(C(.)\) is a function of construction costs; \(W\) refers to wage rates related to construction; \(U\) is the rate of unemployment; \(N/A\) is population density; \(L_{1}\) is land with planning permission for housing; \(L_{c}\) refers to constraints on future land availability; and \(L_{p}\) is planning policy for land to be released for housing.

Bramley argues that

if housebuilders with limited supplies of existing land with permission expect little further land to be released, they will reduce output to maintain an even workload into the coming years and will exploit the profitable rise in price or profit that would result from land shortage. However, if the land supply is expected to increase, the reverse effect may be expected (Bramley, 1993a, p. 1031).

While planning may be seen as exogenous, the model permits the supply of planning permissions to be affected by the state of the market. The flow of planning permissions, \(L_j\) is written as

\[
L_{dj} = L_{j-1}(L_{cj}, L_{pj}, P_j, \Delta P_j)
\]

Linking stocks and flows is the identity

\[
L_{dj} = L_{dj-1} + L_{dj-1} - Q_{j-1}
\]

The findings of this model are discussed in the next section on empirical results. However, there have been a number of criticisms levelled at Bramley’s approach. Evans (1996) and Pryce (1999) dispute the reliability of applying cross-sectional data when attempting to simulate outcomes over time. Specifically, Pryce argues that the functional form of the model outlined is over-identified with the result that

It is possible to arrive at multiple estimates of the same parameter from the estimated system of equations, and there is no assurance that these will be the same; neither is there any method of determining which estimate is the most accurate (Pryce, 1999, p. 2287).

Evans (1996) argues that the model developed by Bramley (1993a, 1993b) will understate price and output responses as a result of increased land release. This is in part due to the application of cross-sectional data to reveal responses over time, but also because increased land supply comes through the model as a change in structure plan provision for housing which, in the model, has a weak relationship with housing output. Evans (1996) argues that, since this result was computed for 1988—a time when the housing market in southern England had reached its peak (in terms of the rate of price increase)—it would have been reasonable for housebuilders not to increase output even if more land was made available, since it would no longer be profitable. Given the cross-sectional nature of the data used, Evans argues that the conclusion of a weak supply response to more land provision cannot be applied to other points in time. As the planning system has changed since the 1980s, Bramley (1996) responds to this point, suggesting that under the new ‘plan-led’ approach, the implementation gap will be reduced leading to greater correlation between proposed and actual new housing development.

The point raised by Evans (1996) regarding the possibility of a time-varying response of the building industry is developed further by Pryce (1999) who examines the price elasticity of supply of new housing at different points in the market cycle. The theoretical possibility of there being a backward-bending supply curve is also tested. Given relative supply inelasticity and the impact of planning constraints, large demand increases in boom periods may not call forth further supply and indeed the supply of properties for sale may fall. While this may
seem illogical, landbanking may result in periods of excess demand as there exists the expectation of even higher prices if potential land supply is withheld from the market. Pryce (1999) further argues that development controls can raise uncertainty regarding planning policy and this further encourages holding vacant land off the market.

Pryce (1999) uses the same data-set as that of Bramley and Watkins (1996) but criticises the econometric methodology employed in these earlier studies. In particular, the use of lagged terms—for example, using lagged values of price to determine output does not deal with simultaneity effectively, as Pryce reasonably points out. He argues that

the endogeneity of output and price is not removed when a lagged response is introduced, but merely results in a domino effect originating in the infinite past (Pryce, 1999, p. 2287).

This, Pryce points out, will lead to inconsistent supply estimates.

While similar to Bramley’s model, there are also differences in the specification employed by Pryce. Land supply is defined as land with outstanding planning permission. This is different from the structure plan provision variable used by Bramley. Evans (1996) criticises the use of structure plan provision as a supply variable arguing that this is why estimates of supply responsiveness are so low in Bramley’s model—structure plan provision and actual output being very different. Pryce’s model also differs from Bramley’s in that private housing starts rather than completions are used. Pryce argues that completions do not adequately capture the relationship between housing construction and land supply and, furthermore, that land supply and completions may be only weakly related. Pryce estimates the following structural demand and supply relationships

$$Q_s = \alpha_1 + \alpha_2 P + \alpha_3 P^2 + \alpha_4 L + \alpha_5 D + \alpha_6 U + \alpha_7 U^2 + \epsilon_s$$  (6)

$$Q_d = \beta_1 + \beta_2 P + \beta_3 U + \beta_4 Z + \epsilon_d$$  (7)

where, the dependent variables in (6) and (7) are quantities supplied and demanded respectively; $P$ is house price; $U$ is unemployment; $L$ is land supply; $D$ is the percentage of residential development on land in former urban uses; and $Z$ is the percentage economically active in social classes I and II.

Pryce points out that the model above is exactly identified and hence does not suffer from the problems created by overidentification prevalent in Bramley’s model. Certainly, the two-stage least-squares approach adopted by Pryce can cope with any overidentification problems that might exist.

The approach adopted by Pryce is again within mainstream economics, following standard econometric techniques. Again, like Bramley’s model, it is concerned with outcomes and not processes. In Bramley’s model, equations (4) and (5) explicitly attempt to take on-board the impact of the planning regime. This is absent from Pryce’s model. It could be argued that Pryce’s model does not recognise the complexity of the impact that planning policies can have on housing supply. This could also be said of Evans’ (1996) criticism.

More recently, Bramley (2002) re-examines the responsiveness of supply in housing markets. This is examined within a migration model developed for England and Wales. House prices are measured in real terms and supply is measured as the flow of new completions, which is different from the supply variable used in his previous models.

Given the criticism of endogeneity in the earlier models, results are produced by two-stage least squares (2SLS) as well as ordinary least squares (OLS). Various functional forms are also adopted. Variables included are house price, land availability, income, unemployment, share of former urban land, occupational class, single marital status, ethnicity, climate, an interest rate and a London dummy. Various combinations of these variables are used in alternative formulations.

While mainstream approaches have dominated the literature, alternative approaches have also added to the debate on the impact
of land-use planning on housing markets. This can be seen recently in the work of Monk and Whitehead (1996, 1999) and Monk et al. (1996).

These approaches may be seen as complementary rather than conflicting. Monk and Whitehead (1999) use both mainstream comparative static analysis and behavioural approaches in order to provide a richer analysis of the interrelationships that exist between planning and housing markets. An advantage of this is that both processes as well as outcomes can be examined.

Monk and Whitehead (1999, p. 74) point to one of the objectives of the government’s planning policy that is, “to meet foreseeable housing needs through a national policy and allocation system”. Hence, housing needs are estimated at an aggregated national level and the planning system needs to ensure that these requirements are delivered at a local level. The planning system therefore imposes requirements and constraints on how the market would behave in different local areas.

The authors point out that, at the time of writing, the planning system must provide a five-year supply of land sufficient to meet housing needs. However, they also assert that planners have ‘adaptive’ and not ‘rational expectations’. They look backward when estimating future needs, to varying extents, and thus planned provision may differ from housing needs that are dependent upon changing local and regional macroeconomic circumstances. Planners, they argue, fail to take account of housing sub-markets and assume that excess demand in one area will be compensated by increased supply in another. However, since no two places are the same, this equilibrating assumption is misplaced.

Monk and Whitehead argue that

Planning changes the market and in a market-based system there are effects on absolute prices because of the overall constraint and on relative prices because land and housing markets are segmented. (Monk and Whitehead, 1999, p. 77).

Segmentation is measured by the extent to which land and housing in different areas are less than perfect substitutes.

Housing market segmentation leads the authors to adopt behavioural approaches in addition to comparative static analysis. They state that

[Changes] in relative prices between localities can only give an indication that either there is a constraint on land supply, or an increase in demand, or both—comparative statics cannot interpret the observed outcomes. This is where a more behavioural approach is essential (Monk and Whitehead, 1999, p. 77).

The authors hypothesise that the planning system constrains the total supply of land for housing. Also, they argue that the number of locations will be reduced and the timing of development will be affected, as will the way land is developed. These extra ‘costs’ to development will then reduce supply. The segmented nature of the housing market, between locations and also property types, means that demand in one area is not perfectly substitutable into another location. However, since there is some substitutability, the authors distinguish between the absolute and relative impacts of planning constraints mentioned above. Thus, planning constraints make all house prices higher and also make relative prices rise more for housing in more constrained areas and property types. The extent of the relative price differential will depend upon the degree of substitutability between areas and house types.

Monk and Whitehead also consider other impacts of planning policy on housing development. They argue that it alters the proportions of factors of production, increasing the capital element, and raises densities.

As the authors recognise, the above hypotheses are within the mainstream tradition of analysis. The behavioural approach is also used by the authors. This approach is used to show “whether the actual outcomes of the planning process impact on behaviour” (Monk and Whitehead, 1999, p. 78). It also permits the heterogeneity of different areas to be taken on more fully and can potentially
consider what mainstream economics might view as non-rational behaviour. Non-rational behaviour by land-owners can be considered. Expectations of future land prices and hence apparent irrational behaviour, of withholding land in a tight market, can also be explained within a behavioural approach.

In an earlier paper, Monk et al. (1996) examine social benefits versus private and social costs associated with planning and housing supply. Looking at the 1980s, they note that land prices showed greater volatility than house prices. The study uses a behavioural approach and examines questions similar to those in Monk and Whitehead (1999). It also examines the impact on costs of volatility and speculation in the market.

Finally in this section, before examining US literature, two papers are discussed that compare both the UK and the US. The first of these, Malpezzi and Maclennan (2001), investigates the long-run price elasticity of supply of new construction. They present two models. The first is a flow model where demand is a function of house price, income and population. Supply is written as a function of house price only. Given that the flow model assumes that all adjustment takes place in one time-period, the second model is a stock adjustment model. Demand is then some proportion of the difference between the desired stock and the previous period’s actual stock. The desired stock itself is a function of house price, income and population.

In practice, the authors estimate a reduced form equation with house price as the dependent variable. They identify the key underlying parameter of this investigation, the price elasticity of housing supply, based on parametric estimates of housing demand parameters from the literature (Malpezzi and Maclennan, 2001, p. 283).

The second study spanning both UK and US literature is by Bartlett (1988) who reviews different approaches made to the estimation of the price elasticity of housing supply. It can be measured indirectly from housing production functions where the elasticity of substitution is measured first, although assumptions regarding market structure have to be made in this approach. Alternatively, estimation can be ‘direct’ using a housing supply equation. Problems with this approach include identification of the equation and replacing the measurement of housing services with the asset price of houses. However this approach is not so sensitive to assumptions of housing market structure.

Bartlett criticises Muth (1969) for applying elasticities based on cross-sectional data to the measurement of long-run values—similar to the criticism levelled at Bramley (1993a, 1993b) above. For example, in the long run, the author argues that, as indicated by Whitehead (1974), if higher demand raises interest rates there is then a link between higher house prices and the cost of capital affecting construction costs which in turn would alter the calculation of supply elasticity.

In relation to estimation of supply functions, Bartlett argues that, in the work of de Leeuw and Ekanem (1971), concerns persist as to whether they actually measure long-run values or combine unknown short- and long-run effects, their estimated structural relationship including both quantity and price.

Bartlett proceeds to discuss short-run measurements. Most of the papers referred to in this section are US based and hence the discussion of their results will follow on below.

**US Literature**

In contrast to that of the UK, the US literature concentrates on the impact of zoning on housing markets. This is inevitable given the different nature of US land-use planning. Theoretically, zoning is used to remove negative externalities (externality zoning) that could be caused by uncontrolled contiguous land uses. In US literature, ‘fiscal zoning’ has become important. This is also referred to as ‘exclusionary’ zoning since it can act to exclude lower-income groups.
Methodologically, the US research can be categorised as mainstream economics. Pogodzinski and Sass (1991) review the empirical literature on zoning which is dominated by hedonic models of house prices. Their review critically examines previous methodologies and the extent to which differences in data and specification affect results. The review also looks for common themes and findings in previous literature. As a result, this paper presents a useful way to take an overview of US studies of planning and the housing market.

The methodological approach to capturing the impact of US zoning is to include zoning variables into a hedonic house price model. This is written by Pogodzinski and Sass (1991) as follows:

\[
V = \beta_0 + \beta_1C + \beta_2L + \beta_3D + \beta_4F + \beta_5E + \beta_6Z + \varepsilon
\]

where, \( V \) represents land values (with or without buildings); \( C, L, D, F, E \) and \( Z \) are vectors where \( C \) captures land and property characteristics, \( L \) are location factors, \( D \) are demand factors, \( F \) are fiscal factors, \( E \) are factors reflecting externalities and \( Z \) are the zoning factors. Generally, both \( E \) and \( Z \) can be seen to reflect zoning.

The authors proceed to discuss issues related to model specification. The dependent variable, they argue, should reflect vacant land value since zoning codes run with the land and it is the value of undeveloped land which captures the effect of zoning on potential future entrants into the housing market (Pogodzinski and Sass, 1991, p. 600).

In practice, though, there are limited data on vacant zones and most studies will therefore have to control for the heterogeneity of built structures on land.

Fiscal variables are also important in the US context. As taxes can pick up the impact of omitted variables, some authors argue for creating an instrumental variable to reflect taxes. This has, as far as the present authors are aware, not been a significant feature of UK research, even although local property taxes do vary. Also, it has been argued that both externality and zoning variables should be included since the effects of zoning are many and varied.

Pogodzinski and Sass discuss the appropriate way in which zoning should be included in equations. Simply entering it as a shift parameter does not reflect the true complexity of how zoning operates. They argue that zoning should be interacted with lot size since land zoned for different types of residential properties affects land value.

The authors also consider the possibility that zoning is endogenous. Thus

A local zoning authority may seek to maximise the potential tax-base by assigning properties into the land-use zones which will maximise the properties’ values. If potential land values guide zoning decisions then the estimated impact of zoning on land values will be biased (Pogodzinski and Sass, 1991, p. 601).

This makes it difficult to interpret the meaning of the coefficient on the zoning variable. Pogodzinski and Sass discuss the techniques used in other studies to measure zoning. Some enter dummy variables straight into the hedonic house price model. In other papers, zoning was interacted with lot size. Direct comparison of the results of these papers is problematic due to differences in data-sets, either time-series or cross-section, as well as equation formulations and the appropriateness of these formulations in light of econometric theory.

One clear objective of zoning is the control of externalities. Land uses generating an externality have been measured by using a dummy variable or a distance measurement covering the area where the externality is most acutely felt. Defining the appropriate distance may be problematic, causing either too few or too many individuals included. Also, the externality produced by commercial properties, for example, depends upon the type of commercial enterprise. Pogodzinski and Sass also point to self-selection effects noted in earlier work where households
less sensitive to non-residential contiguous land uses locate nearer to such uses.

Pogodzinski and Sass next review the literature on exogenous land-use zoning regulations. Many of these studies use variables to capture different land uses in their hedonic regression formulations. Within this body of literature, Grieson and White (1989) consider how to separate the impact of externalities and zoning. They employ three different dummies in their model to attempt to do this. The first dummy captures externality effects by covering properties where the neighbourhood contains commercial uses. The second variable measures a pure zoning effect where the surrounding is zoned for only one use type. The third captures the combined impact of externalities and conversion potential on property values, properties where externalities exist and where neighbouring properties are zoned for non-single family use (Grieson and White, 1989, p. 607).

Using these variables, Grieson and White show that externalities reduce land prices. However, their study suffers from small sample size problems, undermining the validity of the results obtained.

Crone (1983) interacts zoning with other variables rather than simply entering them separately into hedonic functions. He examined single and multifamily homes and found that the presence of multifamily homes reduced land values for all property types.

Maser et al. (1977) examined the impact of zoning restrictions in Rochester, New York. They used a number of dummy variables to capture zoning and externality impacts. They tested for the joint significance of these variables using an F-test and found that externality effects did not affect house prices. From this, they concluded that zoning had no impact on prices.

US zoning not only restricts the type of land use, but it also places constraints upon land and structure characteristics. The authors refer to an earlier study by Peterson (1974) which used a hedonic approach and different zoning variables, including zoning for two-family and multifamily uses. He also used a zoning variable for minimum lot size. He found that there was no negative impact of two-family zoning on single-family house prices and that the lot size variable was insignificant. However, Peterson argues that this variable may only be relevant for larger lots that could be sub-divided.

Pogodzinski and Sass also review the literature on endogenous zoning. Zoning rules are seen as a process modelled in some articles as a simultaneous equations system. From these studies, zoning is seen as part of the process of decision-making at a local level. Also, zoning occurs for non-externality reasons such as tax revenue considerations and desires to preserve communities.

Pogodzinski and Sass conclude their review by stating that there is no consensus on the impact of zoning in the US. They regard many earlier studies as being seriously flawed due to specification errors and data problems. A key problem they identify is the way in which zoning is incorporated into hedonic models. The true complexity of zoning regulations is not easily reflected in the variables applied in the mainstream econometric framework of analysis.

Fischel argues that the system of zoning should be seen as “a flexible and decentralised network of restrictions” (Fischel, 1990, p. 229) and that it can also be seen as part of a rational decision-making political-economy process. If zoning has been successful, then externalities should be insignificant in the hedonic regressions above. Observed zoning is then the outcome of an optimising economic and local political process. Benefits and costs, the author argues, will have been capitalised into price.

More recently, Green (1999) suggests that zoning is not socially optimal. He argues that it restricts the availability of low-cost, or affordable, housing. Fiscal zoning via minimum lot size can exclude those below a certain income level living in a particular area. However, low densities may lead to fiscal budgetary pressures.

Green hypothesises that zoning will raise
house prices. Using a case-study area, the author adopts a mainstream economic framework and writes a structural model for demand and supply equations. The equilibrium reduced form equation is written as

$$ P = \pi_1 + \pi_2 \text{Population} + \pi_3 \text{Income} + \pi_4 \text{Age} + \pi_5 \text{Household\_type} + \pi_6 \text{Race} + \pi_7 \text{Wages} + \pi_8 \text{Materials} + \pi_9 \text{Land} + \mu $$  

(9)

where $P$ is house price.

Various zoning regulations are then tested within this model. Green examines 37 municipalities within one county and thus can reasonably assume a single market for materials and labour. Hedonic models are then reported explaining home-ownership, house price and the impact of various zoning regulations.

As part of land-use planning, urban containment policies have become popular in the US and other countries. Dawkins and Nelson (2002) provide an international comparison of policies of this type. Urban containment policies, designed to limit urban expansion, have been argued to increase house prices. This could be caused by a reduction in supply or an increase in demand. If people regard areas outside the constrained area as being highly substitutable, they will move to avoid higher prices. However, the policy itself may reduce the number of lots available for new housing. With less land, there is an increased possibility that oligopolistic landownership may occur. This in turn could crowd out homes for lower-income groups as land-owners may impose a minimum price for new development.

The authors also argue that demand may rise as a result of the containment policy. This is because the policy itself might improve amenities and create positive externalities. However, it has been difficult to estimate the impact of demand and supply changes. Housing supply, the authors argue, has been overlooked as researchers have concentrated on the hedonic approach.

The impact of the regulatory environment on house prices is examined by Malpezzi et al. (1998). The authors construct price indices for rented and owner-occupied houses across 272 metropolitan areas using a hedonic approach. They employ census data and explicitly consider supply-side constraints.

Malpezzi et al. identify a list of regulatory variables that measure the stance of policy affecting housing supply. These include changes in the length of approval time, the time taken for a rezoning application to be approved, a variable accounting for whether zoned land is greater or less than estimated demand and adequacy of infrastructure. These variables are also created for single and multifamily homes. The authors build a regulatory index based upon the values of these variables. Chicago was found to have the lowest value (least regulated) and San Francisco the highest (most regulated).

While many planning regulations are not included in this index, it is argued that they are positively correlated with those used to construct the index. The regulations are then included in the vector of variables affecting the supply of housing. The authors then estimate reduced form equations of rental and owner-occupied housing including the regulatory variables as amongst the list of explanatory variables including income, demographics, fiscal and topographical variables.

4. Review of Empirical Results

This section provides a brief review of the results of the articles discussed in section 3 above. The usefulness of both mainstream and behavioural approaches will be shown.

**UK Studies**

Cheshire and Sheppard (1995) provide hedonic regression results for the cities of Reading and Darlington in England. Reading, in the South East, could be categorised as a city of high demand and tight planning while the opposite could be said of Darlington, located in the North East. The hedonic estimates revealed that open-access land provides a positive amenity to both cities. In relation to new housing construction, this had a positive
impact in Darlington but a negative one in Reading. The authors argue that this is due to the nature of the planning systems in the two cities. In Reading, the authors suggest that the planning system forced developers to build in areas that had “negative unmeasured local amenities” (Cheshire and Sheppard, 1995, p. 258). Alternatively, they argue that high land cost could cause builders to construct houses of inferior quality. This contrasts with similar tight planning in North Hertfordshire (see Monk and Whitehead, 1999, reported below).

Bramley’s (1993a, 1993b) model is presented in equations (1)–(5) above. One of his early results from estimating the demand equation suggests that housing output has limited impact on house price. Thus a large increase in supply would not cause any significant fall in price for given demand conditions.

The supply equation is presented in (3) and includes different measures of planning policy. Bramley presents different formulations of the supply equation. The explanatory power of these regressions is around 60–65 per cent. The planning variables, when significant, have a negative impact on supply, the greenbelt also having a negative coefficient. The response of supply to price is also found to vary across different local areas. The price elasticity of supply varies from 0.29 in Birmingham, to 2.11 in Worcester with an average over all the areas covered of 0.99. When adjustments are made for extra planning permissions and the proportion of new buildings in the total of units supplied, the average supply elasticity falls to 0.31.

Bramley also presents results of the planning permissions equation (4) and reports that planning permissions are responsive to market signals to a limited extent. The structure plan provision variable is not significant. This is consistent with the view expressed by Evans (1996) and the ‘implementations gap’ (allocations in plans not coming forward for development) discussed by Bramley himself. However, results from the planning permissions should be treated with caution as the explanatory power is particularly weak. Whether the planning variables interact with each other is another source of confusion and may make the specification econometrically inaccurate.

The next step is to simulate the impact of increased land supply. The results suggest that, even after a significant increase in land supply, house prices would fall by only about 5 per cent and new housing output would increase by only 10 per cent. Similar results are found in more recent work by Leishman and Bramley (2001) examining central Scotland. They showed that large changes in land supply have little impact on prices.

Bramley and Watkins (1996) update the earlier work and re-emphasise that the lack of correspondence between plan targets and actual supply indicates a certain weakness in the implementation of plans (Bramley and Watkins, 1996, p. 50). Thus changes to the structure plan targets will have little impact on output or price. The authors argue that local plans will be more important in matching permissions to output than structure plans. They also discuss the issue of risk facing developers. This is related to asymmetric response. Developers, they suggest, find it easier to increase output than reduce it immediately (pp. 37–38). Once committed to a project, they may need to follow this through to completion. This, the authors suggest, will also reduce the price elasticity of supply.

Pryce (1999) uses data provided by Bramley to estimate (6) and (7). He argues that his results indicate the presence of a backward-bending supply curve in the 1988 boom period but not in the slump conditions of 1992. He estimates the price elasticity of supply to be 0.58 in 1988 and 1.03 in 1992, despite using the same data-set. These figures contradict the results of Bramley and Watkins (1996), however, the estimates are still lower than the estimated elasticities found in the US. His results also suggest that the responsiveness of house prices to changes in land supply are significantly greater than those estimates found by Bramley. For the same
increase in supply, Pryce finds that prices would fall by over 30 per cent.

Bramley (2002) finds a significant relationship between house prices and income, higher occupational group, unemployment and interest rates. He also finds better climate to affect positively house prices—although if climate is ‘better’ in the South than in the North, this result is not surprising. It may also interact with the density variable.

In relation to the price elasticity of supply, his results suggest that these vary from 0.362 up to 0.585—although the latter result, he suggests, should be regarded with caution.

In contrast to the deductive models described above, Monk and Whitehead (1999) use a case-study approach covering North Hertfordshire, South Cambridgeshire and Fenland. The first two local authorities were regarded as areas of ‘tight’ planning control, while Fenland was regarded as having a ‘flexible’ planning regime. Indeed, in the mid to late 1980s, land with outstanding planning permission rose sharply in Fenland while it seemed not to respond to increasing demand pressure in the other two local authorities. Structure plan policies were closely adhered to in South Cambridgeshire and North Hertfordshire and, as a result of this, developers were discouraged from challenging the decisions made by local planners. Given this stance, as the market rose, developers looked to make profits by developing in areas which faced fewer restrictions. This fed demand in Fenland where planners were more responsive to demand pressures. As a result of this, housing output in Fenland stayed above structure plan provision levels well after the market had gone into recession.

The authors also discovered differences in the types of house being produced in each authority area. South Cambridgeshire was found to have a high percentage of larger houses while smaller houses tended to be built in Fenland. Dwellings of all sizes were built in North Hertfordshire throughout the decade, but tended to be of higher quality and thus price. Densities of housing did not seem to be higher where land prices were higher.

Monk and Whitehead’s behavioural approach also permits them to examine the relationship between planners and developers and how interaction between them affects market outcomes. This is important when relatively few market participants have such a significant impact on market outcomes. It is quite different from the ‘invisible hand’ of the market.

Generally, developers accepted planners’ decisions in areas of tight control, but were more willing to appeal decisions in areas of weaker control. Hence, they were more likely to challenge planners’ decisions in Fenland than in the other two local authorities.

The authors also highlight the poor information that developers have when entering new areas. They argue that developers exacerbated the boom-and-bust conditions in the Fenland market, a market with which they had previously been unfamiliar. This is also related to the notion of housing market segmentation. Fenland was not seen by purchasers as being the same as the other localities, but became attractive in the boom simply due to the cost of living in South Cambridgeshire and North Hertfordshire.

Monk et al. (1996) adopt a similar case-study approach, comparing four locations—Reigate and Wokingham in the South East and Beverley and Barnsley in Yorkshire and Humberside. These covered a spectrum of high (Reigate) to middle to low demand (Barnsley). One interesting finding here was that while Barnsley had a policy of large land release, the local planners attempted to channel new housing development towards selected locations relating to employment generation rather than housing market demands (Monk et al., 1996, p. 504).

Hence, developers’ site preferences were compromised. The study also suggested that the planning system increases the volatility of the housing market.

In their comparative study, Malpezzi and Maclennan (2001) use annual data covering the period 1850–1995 for the UK and 1889–
1994 for the US. Statistical tests for stationarity and cointegration are performed on the variables and estimated relationships respectively. The long time-series provide interesting results, covering regime changes, structural breaks and changes in estimates for price elasticity of housing supply. In the UK, supply

was more elastic pre-war than post-war. Taken as a whole, the post-war estimates suggest a less than perfectly elastic long-run supply of housing in the UK (Malpezzi and Maclennan, 2001, p. 299).

The results suggested that the price elasticity of supply from the flow model was between 6 and 13 for the US in the post-war period, and between 0 and less than 1 for the UK over the same period. The stock adjustment models suggested elasticities of between 1 and 6 for the US and 0 to 1 for the UK.

Malpezzi and Maclennan go on to argue that an examination of the behaviour of house prices in other countries would further illuminate the role of institutions and their interaction with market outcomes. Higher elasticities in the US, they suggest, clearly relate to the less restrictive planning regime as compared with the UK.

**US Studies**

This section reports some results from US studies into the impact of zoning on house prices. However, behavioural approaches are still relevant here. As has already been pointed out, US zoning policy can include a plethora of regulations which traditional econometrics will find very difficult to model accurately.

Green (1999) presents results for homeownership, house price, rent and the share of low-cost housing. Various zoning requirements are added as dummy variables to these models. In terms of the relationship between the dependent variables in these models and the zoning variables, the results are usually statistically insignificant. Only permission for mobile homes and sidewalk requirements ever become significant. In fact, no controls are made for differences in household characteristics. Also, the variables for age, education and income are probably interrelated and can generate spurious results when included in the same regression model. Thus, there are significant problems here with equation specifications.

Finally, Green argues that zoning constraints have a non-linear impact with respect to house prices. Lower-income households face greater regulation than higher-income groups as a result of the method of implementation of land-use regulations. Again, equation specification makes it difficult to interpret the results in this fashion. Key variables such as minimum lot width are never significant. The econometric specification adopted seems flawed, including many variables that will be correlated with each other—for example, age, income and education are present in the same equation.

Dawkins and Nelson (2002) compare the US with other countries with regard to urban containment policies. Within the US, they examine Oregon and California. In Oregon, policy-makers wanted to ensure that they were able to supply new land for housing and facilitate economic growth even when containment policies were implemented. Early studies found no land price effects, although the full effect of the containment policies had not been felt at that stage. Later studies found discontinuities in the bid-rent function at the urban fringe and one study also found the bid-rent curve to slope upward at the urban growth limit. In the UK, this might be seen as similar to the potential effect of living on the edge of the greenbelt with significant amenity value.

The urban containment policy also had the objective of controlling house price inflation. However, evidence suggests that local economic conditions were much more important than planning regulations in this regard.

In California, planning policy had a specific objective of controlling the supply of housing. Studies suggest that house prices in controlled areas were raised relative to uncontrolled areas, although it is not clear that that characteristics of areas and houses
were taken into consideration in these studies.

Different areas also imposed different types of urban containment policies which resulted in different impacts on land and housing markets. Sacramento, which permitted flexible boundary changes, maintained a ‘competitive’ housing development sector with a range of house prices and styles. Fresno placed charges on new development and had a concentrated development industry. House types and price range were limited in this area. How much of this is due to planning policy and how much to industry structure is unclear. In San Jose, the urban growth boundary was relatively fixed and resulted in increased land and subsequently house prices. Thus, the impact of urban containment policies on house prices depends upon the exact nature of the policy and how it is implemented.

Malpezzi et al. (1998) estimate hedonic regression models that include variables reflecting the regulatory environment. Their results suggest that income is positively related to house prices while the impact of population change has an unexpected sign or is insignificant. They also find that “regulation drives up quality adjusted rents and house prices, but by somewhat less than found in previous work” (Malpezzi et al., 1998, p. 263).

Finally, Bartlett (1988) who provides a review of findings suggests that

Results are consistent with the notion of a positive short run elasticity of supply of housing services by owner occupiers which is highly variable between locations and personal circumstances (Bartlett, 1988, p. 16).

For the long run, his review indicated an upper value for the price elasticity of housing supply of approximately 2.

5. Conclusions

This paper has provided an overview of some of the recent research into the relationship between the housing markets and the planning systems in the UK and the US. In both countries, mainstream economics is the dominant theoretical framework against which these relationships have been examined. These models are deductive and focus on outcomes. This is not unimportant, however, in the context of a market where there is limited information and relatively few market actors (planners and developers) who thus have some degree of market power. It is also appropriate to analyse other methodologies that are able at least to fill the gaps left by mainstream economics or deductive approaches.

The paper has shown that the UK and US planning systems are very different, reflecting different traditions and governmental systems, although facing similar issues. The UK can essentially be characterised as ‘plan-led’, whereas the US could be described as ‘market-led’. However, the research discussed above also highlights the need to take account of the varied impacts of planning legislation. The heterogeneous nature of the land market, the relative strength of local economies and the interaction between market actors require analysis through behavioural and institutional approaches as well as via econometric modelling techniques.

Government interventions via planning and other means, including urban regeneration policy, have a substantial impact on the availability of land for new housing. Recent policy has also indicated that new house-building should take into account environmental considerations. This increases the importance of re-using land. However, in areas of high demand, the government’s target for the proportion of new build on brownfield land has already been met and it is difficult to see how further increases in population density will have anything but a negative impact on local amenities in such areas. Open spaces then command a premium.

The review above has not covered all the aspects of the relationship between housing provision and planning policy. It can at best be partial given the complex nature and vari-
uous aspects of the relationship. The concern of many authors has focused on the price elasticity of supply. As Meen et al. state

Empirical evidence strongly suggests that long-run price elasticities are considerably lower in the UK than the US. This is a commonly quoted reason for the stronger trends found for UK house prices than for US prices (Meen et al., 2001, p. 4).

The range of estimates that exists may reflect the different estimation techniques and methodological approaches adopted. As Adams and Watkins point out

these studies seek to provide a partial analysis of the distributional effects of planning intervention in the housing market. Although [the] estimates differ, it is clear that planning constraints lead to higher prices, and densities, restrictions in the quantity of homes supplied and convergence in the type and design of new homes (Adams and Watkins, 2002, p. 255).

The mainstream approach has been supplemented in the literature by behavioural analyses. These have the advantage of being able to examine the complex interactions between planning policy and housing development. Results from this approach have highlighted how risk affects developer behaviour, how information asymmetry on local markets can affect development profitability and how monopolies or oligopolies in the development industry can affect the pattern of land release.

The complexity of the relationship between planning and housing markets is still an issue for the mainstream economic approach in both the UK and the US. Thus there remains much work to be done on specifying appropriate models and also finding better quality data. The aggregate long-run series in Malpezzi and Maclennan (2001) may not exist for more disaggregated data levels; however, potential sources of such data could usefully combine time-series and housing characteristics (an example of this would be the data available in Scotland) thus bridging the gap between purely time-series and cross-sectional studies. The contribution made by the behavioural approach could also be usefully extended to other case-study locations, perhaps contributing to a grounded theory model of the interaction between planning policy and the housing market.

Notes
1. The authors are currently part of a research team from the Universities of Aberdeen and Glasgow working on a project funded by the UK’s Office of the Deputy Prime Minister that seeks to develop new models of land and property markets.
2. ‘Assessing the impact of ODPM policies on land pricing’, project currently underway funded by the ODPM and undertaken by the Universities of Aberdeen and Glasgow.
3. Assuming the house is the owner’s main residence.
4. The development plan system is currently undergoing potentially significant change across the UK. It is likely that the structure plan will be abolished in most areas and replaced by a single-tier development framework with increased regional planning guidance (ODPM, 2002; NAW, 2002; Scottish Executive, 2002).
5. It is interesting to note, however, that the UK is moving to a more federal government structure as a result of devolution in the late 1990s. There are early signs that some divergence in planning may occur at some point in the future with the UK therefore beginning to reflect the more varied US approach to planning.

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