



SCOTTISH LAND COMMISSION
COIMISEAN FEARAINN NA H-ALBA

Residential development land prices and house prices

A discussion paper

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Summary

The University of Reading has been asked by the Scottish Land Commission to produce this paper investigating the relationship between housing development land prices and house prices in order to clarify whether high house prices cause high residential land prices or the other way around.

There is not a single or one-way direction of causation between land prices and house prices (or vice versa). This is because demand and supply factors influence price and output outcomes *simultaneously*.

Nevertheless, the following statements can be made:

1. *The housing market affects the land market rapidly.* Changes in the demand for houses alter house prices as housing market activity picks up or slows down. Housing development land prices adjust swiftly, encouraging or dampening the incentive to supply development land.
2. *The land market affects house prices more slowly.* Changes in the supply of housing development land alter land prices quickly, but influence house prices more slowly due to building lags.

This indicates that a policy that reduces housing development land prices by increasing land supply in a competitive environment would reduce house prices over the long-term. However, to do so, the increase in land supply would have to be sufficient to absorb both the long-term increases in housing demand caused by rising living standards and the stimulus to demand generated by the more plentiful housing supply itself. This would alter the present distribution of the housing stock and relative house prices across Scotland.

The implication of these findings for policy makers is that policy should not be targeted at managing short term price fluctuations in housing and residential development land, but rather focused on long term trends with regard to housing and land supply.

Keywords

Residential land; land market; housing market; price

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1 Introduction

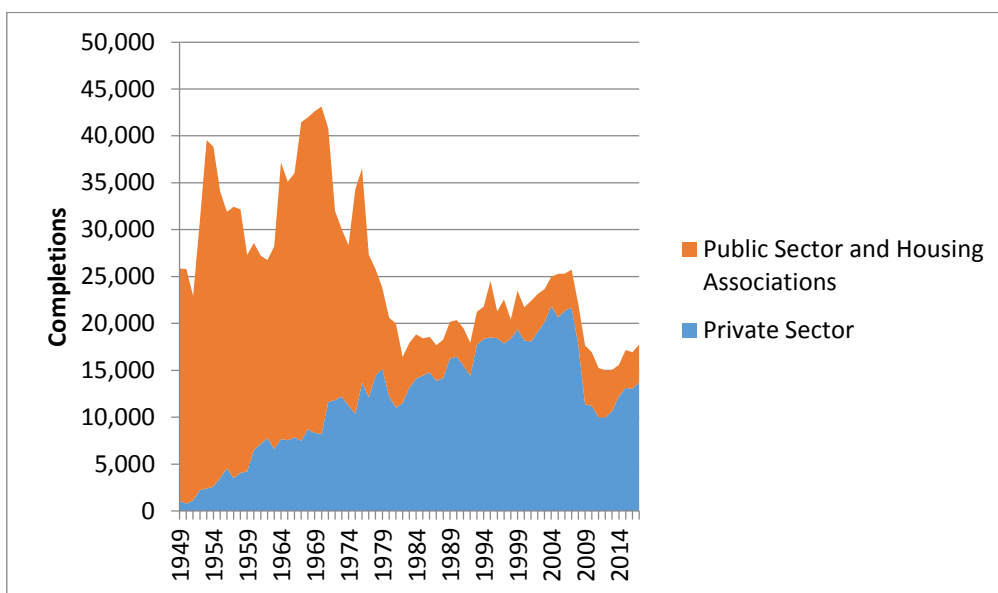
The University of Reading has been asked by the Scottish Land Commission to produce this paper investigating the relationship between housing development land prices and house prices. It is important to set out this relationship clearly, because the way in which it is framed and discussed in the policy literature has an influence on the range of policies which are being proposed for dealing with the current 'housing crisis' in Scotland and the rest of the UK.

The paper draws on the existing academic literature to present the underlying theories associated with housing development land markets and housing markets and how pricing within these markets works. The key objective of this paper is to clarify some of these relationships for the non-specialist reader.

1.1 Housing supply in Scotland

Parts of Scotland and the rest of the UK are currently suffering from a shortfall in the supply of housing. For centuries, private housebuilding prevailed in the UK but from the 1920s until the end of the 1970s there was a substantial increase in public sector housebuilding, particularly in Scotland. Figure 1 shows the long-run decline in housing output in Scotland since the late 1970s, and shows that this is associated with the relative decline in the proportion of homes delivered by the public sector (despite a consistently upward trend in private housing delivery during this period). Scotland and the rest of the UK now rely on private housebuilders to provide the majority of new homes.

Figure 1: New house building in Scotland since 1949



(Source: Scottish Government, 2018a)

Whilst housing supply has reduced, housing demand has risen, and this has led to increasing house prices. The average house price¹ in Scotland has increased by approximately 590% since 1980 (approximately 54% in real, inflation adjusted terms) (Nationwide, n.d.). This is broadly in line with trends elsewhere in the UK, although over the short-term price performance can vary considerably.

In order to address the current shortfall in housing supply, the independent Commission on Housing and Wellbeing recommended that the Scottish Government should deliver 23,000 new houses each year (Commission on Housing and Wellbeing, 2015). Furthermore, the Scottish Government has committed to deliver at least 50,000 ‘affordable homes’ between 2015 and 2021 through its Affordable Housing Supply Programme. This represents a 67% increase in affordable housing supply (Scottish Government, 2018b).

1.2 Policy proposals and the residential land market

What is commonly called the ‘housing crisis’ is now at the top of the political agenda in Scotland and in the rest of the UK. Policy papers have been produced by governments and by think tanks that explore policy options (e.g. Bentley, 2016, 2017; Griffiths & Jefferys, 2013; Macfarlane, 2017; Murphy, 2018; O’Brien, 2018; Shelter, 2016). Policy ideas are variously aimed at:

- stabilising house prices and improving housing affordability;
- increasing the supply of new homes (in both the ‘market’ and ‘affordable’ tenures);
- reforming the residential land market in order to increase supply;
- raising the amount of government money, or land gifts, from taxing privately-owned land, with the revenues spent on public and social infrastructure (including affordable housing).

In many of these papers, a key area for policy intervention is the residential *land* market.² This is for two reasons: a) land is an essential component in the production of a dwelling, and b) the value of a dwelling is a composite, comprising the value of both the structure and the land on which it is built. Therefore, the supply and price of residential land is a factor in the supply and price of housing.

1.3 Land prices and house prices – potential for confusion?

The dominant view expressed in the professional literature regarding land prices and house prices is that the price of residential land is driven by the price of new homes (Banks, 2017; Hudson, 2015; LABC, nd; Smith, 2017; Ward et al, 2018). This view is a result of the specialist ‘residual’ calculation professionals use to value development land, whereby development costs are subtracted from the total anticipated value of the new homes which are to be delivered on the site, so as to arrive at a

¹ Throughout this paper, the term ‘house prices’ refers to the price of both houses and flats. Similarly, ‘housing’ refers to houses and flats.

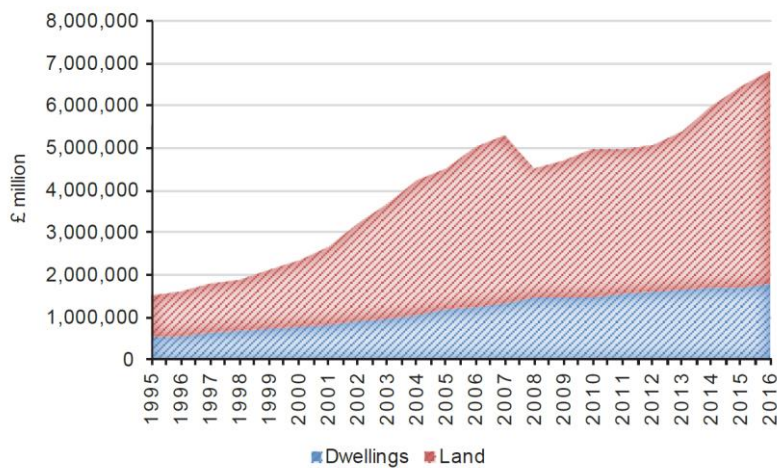
² This is the market for land on which houses are built, i.e. housing development land.

‘residual land value’.³ Therefore, the land value is responsive to changes in assumptions regarding how much the new homes will sell for; the higher the assumed sale prices of the new homes, the higher the land value. In the context of this residual calculation, therefore, it is house prices that appear to ‘drive’ residential land prices.⁴

However, some of the policy papers produced by think tanks and policy specialists (and the academic papers they draw from) present the relationship between house prices and land values in apparently different terms, arguing that it is the increasing price of residential land which has been driving the increase in house prices (e.g. Davis & Palumbo, 2008; Knoll et al, 2014; Macfarlane, 2017; Murphy, 2018; Ryan-Collins et al, 2017: 8). The analyses within these papers point out that the price of a house can be conceived as comprising two components; the price of the land and the price of the structure.

For example, Macfarlane in a Scottish Land Commission Land Lines paper (2017: 3-4) uses Office for National Statistics data to show that the land component of house prices in the UK has grown significantly in comparison with build costs since 1995 (shown in Figure 2). This is calculated by subtracting construction costs from total house prices in order to arrive at an implicit land value component of house prices.

Figure 2: Value of dwellings (excluding land) and the value of land in the UK



(Source: Macfarlane, 2017)

The conclusion can be drawn that the “driving force behind rising house prices has therefore not been increasing building costs but increasing land prices”, which is “consistent with international

³ This form of calculation is discussed in more detail in section 4.3.

⁴ The theoretical basis for considering land value to be a residual driven by house prices derives from the now outdated economic theory developed by David Ricardo (1772 – 1823). This is discussed in Appendix A, which summarises the evolution of the economic theory of land rent.

evidence that suggests that house price volatility is primarily driven by land values” (Macfarlane, 2017: 3). Similarly, Knoll et al (2014: 29) in their study of global house price growth over the period 1870 – 2012 argue that “higher land prices, not construction costs, are responsible for the rise in house prices in the second half of the 20th century”.⁵

To the non-specialist reader, it could appear as though the professionals and the policy specialists are making two competing arguments regarding the direction of causation between high residential land values and high house prices. In the scenario discussed by the professionals, it appears as though high residential land values are driven by high house prices, and in the scenario discussed in some of the policy literature it appears as though high house prices are driven by high residential land values. Each of these scenarios has potentially different implications for policy. It is for this reason that the Scottish Land Commission has requested that the University of Reading provides this paper to clarify the nature of this relationship.

In the remainder of this paper, it will be shown how the apparent dichotomy described above is in fact a rather artificial one and arises from two different (but not opposing) ways of thinking about the relationship between residential land values and house prices. The ‘professional’ view arises from how development land is valued as a residual at a particular snapshot in time by professional valuers and housebuilders active in the land market, and the ‘policy literature view’ arises from taking in to account the relationship between the supply of residential land and house prices as well as the wider dynamically interrelated economic forces which simultaneously influence the price of development land and the price of housing through time.

The remainder of this paper is structured as follows:

- The housing market.
- The residential land market.
- Pricing housing and residential land.
- Land supply, housing supply and the price response.
- Conclusion.

2 The housing market

Like all other markets, the amount and price of housing is determined by the interaction of demand and supply. The links between house prices and land prices and between the housing market and the development land market can be identified by starting with the housing market.

⁵ The land vs construction component of house prices is discussed in more detail in Section 4.2.

2.1 Existing housing and new build housing

The housing market comprises the entire stock of housing, including existing homes as well as new additions i.e. new build housing, plus conversions minus demolitions. The housing market is the market where people buy, sell and rent homes, and differences in locations and attributes are priced into overall property values. This means that there is not a separate new homes market where prices are determined differently to the prices of existing homes.

2.2 Demand for housing

Housing demand identifies how much households are willing-to-pay ('can afford') for their home and the tenure choice they make about whether to rent or buy. The demand for housing is affected by people's incomes and wealth. There is a feedback element here, as housing also forms an important part of household wealth. Individual housing demand choices are also influenced by the relative cost of housing, its 'affordability', as well as the availability and cost of mortgage finance. Expectations play an important part as well: will prices rise or fall; what will happen to interest rates and to household income?

People also need to have their homes connected to the other parts of their lives – jobs, leisure pursuits, family needs, etc. – so location matters. Prices vary locationally in terms of neighbourhood attractiveness and accessibility. City centre locations generally mean shorter commuting times and so command premiums; more distant locations are generally cheaper. Therefore, people have to decide between paying more for housing or longer travel times.

In this description of individuals' housing demand choices, prices come into play at three decision points:

1. whether to rent or buy;
2. the size/quality of the home, and;
3. its location.

These price influences have to be assessed in relation to what people want (their preferences) and their ability to pay (incomes and wealth). The three decisions are made *at the same time* and involve trade-offs, such as whether to live near the expensive centre or buy a bigger place further out and commute.

To examine housing demand *as a whole*, individual demands have to be aggregated, so demographics and distributions of income and wealth matter. People are also mobile and may wish to move from one city or region to another, say, to find a better-paying job. However, the desirability of such moves will be influenced by the relative cost and availability of housing in both

locations. Falls in housing costs, for example, may induce more inwards migration from other regions. Regional population flows consequently have to be included in the aggregate mix.

2.2.1 Demand for housing in Scotland

Rather than changing demographics, rising demand for houses in Scotland has been fuelled mainly by improving levels of income and wealth, aided by falling interest rates, easier credit and a tax regime that makes it attractive to invest in housing. This can be observed from data on population and earnings; the Scottish population has increased over the last 30 years by only 6% whereas average earnings have grown by 87% in the past twenty years alone (ONS data). Studies from around the world consistently demonstrate that, when incomes rise, households spend pretty much the same extra percentage on their housing. In other words, if incomes rise by 87%, households are prepared to spend around another 87% on their housing. So, income growth has trumped demographics in pushing up housing demand in recent decades by a long way.

Rising living standards not only lead to increased demand for housing but also increased demand for better quality housing. Unfortunately, the data available report only the number of homes, and planning policies remain focused on numbers, so it is difficult to determine to what extent the desire for better quality accommodation has been met. House condition surveys report considerable improvements in the limited array of items they measure. Yet surveys and anecdotal evidence suggest that many remain frustrated with their housing, with its cost or the long commute to work required in order to find something affordable.

People also want homes near to places of work, so demand varies across Scotland. Cities with the strongest economies face the greatest pressures. They are also often the ones with some of the greatest constraints on new suburban building and with widespread conservation areas in already built-up parts of the city, which limits the option to use expensive land to build at higher densities, particularly through large multi-story blocks.

2.3 Supply of housing

The supply of houses comes from existing owners and from housebuilders. The decision to sell by existing property owners is influenced by their own housing demands, incomes and life choices at particular points in time, as well as relative house prices and the ease (or otherwise) of selling and moving.

Supply of new build housing is driven by the cost of profitable supply. Housebuilders have to pay for construction, land, finance and transactions items (legal and agency fees, planning, etc.). Each of these elements influences how much can be supplied at particular levels of house prices. Each of these cost inputs has its own market and builders have to bid enough in them to attract labour and

land away from other uses. The operation of this residential land market and its role in the supply (and, therefore, price) of housing is discussed in the next section.

3 The residential land market

It is the operation of the residential land market, and how it links to the housing market, that is of particular interest here. The availability of land is determined to a large extent by the town and country planning system (primarily, residential land allocations in development plans and the number of planning permissions) and the preferences of private landowners. The availability of capital is influenced by the finance market and the terms on which it is prepared to fund housing construction. The availability of labour and materials is influenced by the level of housing construction activity and the supply of labour.

3.1 The housing development process

At this point it is worth briefly summarising the housing development process because it is this which produces new housing supply:

1. **Land acquisition:** housing development land is identified and purchased from the landowner by the housebuilder.
2. **Feasibility:** the housebuilder conducts ongoing feasibility work to identify the form of development which is both viable and deliverable. Viability monitoring continues throughout the process.
3. **Permissions:** the housebuilder secures the necessary permissions, including planning permission.
4. **Construction:** once planning permission is granted, the housebuilder secures a building contractor and the site is built out.
5. **Marketing and sale:** throughout the construction process, the new homes are marketed and sold off-plan and/or following completion.

This process has a number of important characteristics:

1. The housing development process in the UK is **dominated by private housebuilders** and the housing development process is **speculative**, in the sense that it is for the general market rather than a known client.
2. Development takes a **long time**, which means that speculative housebuilders must wait a long time for a return and that there is increased uncertainty associated with that return. Consequently, they require higher profit margins to compensate for the time and risk.

3. Development is **costly** and therefore usually requires borrowing. This adds to the uncertainty and risk.
4. The **supply of development land** is regulated by the planning system and is subject to landowner behaviour, as landowners can choose whether and when to release land for development.

3.2 Demand for residential land

When housebuilders bid for land, they are competing with other housebuilders and other potential uses. Housebuilders look at a variety of sites in terms of the prices at which landowners are willing to sell and the relative profitability of building there rather than elsewhere. Therefore, the land market is like any other in that the interaction between the demands of many potential users and the supply offers of many suppliers determines the prevailing price.

However, land differs from other markets where more standardised goods are sold because land is locationally bound and therefore varies widely in its usefulness and attractiveness. Therefore, housebuilders have to outbid other potential uses at specific locations and the bids will be influenced by the prices at which they can sell houses and by what other uses are willing to pay to locate there; which, in turn, will be affected by how attractive that location is to buyers. The result of this competitive bidding means that land is allocated to its economically optimum use. There will be locationally-driven relative differences in prices and also a general price level for land within any specific, city, region or country, reflecting overall demand.

3.3 Supply of residential land

The locationally-bound nature of land means that the owner of land at a particular location has a degree of monopoly power in terms of its supply. Furthermore, if the supply of land into particular uses is restricted, the price of land in those uses will be forced to rise. If, for example, agricultural land cannot be transferred to urban uses, say because of restrictive planning controls, the cost of all urban land using activities will rise. This means that demand will not be met due to the reduction in building and the resultant lack of affordability. A reluctance of rural landowners to sell land for urban development would have a similar effect.

The effect that a relative undersupply of residential land might have on the supply of new housing will be mitigated to a certain extent if houses are built at a higher density. The intensity with which land is used for housing is influenced by the price of land. Where land is expensive, gardens are likely to be scarce and tall blocks of flats more common as developers and households economise on the expensive land input. In places where land is cheaper, there is greater opportunity to consume more land. This sets the typical urban pattern of high density use in central city areas and more spacious

properties with gardens in the suburbs. Planning regulations may fix maximum density or impose conservation rules which limit the opportunities to build (or rebuild) at higher densities when land prices rise. Where such constraints exist, they have a similar effect on housing supply as restricting the supply of land.

4 Pricing housing and residential land

Sections 2 and 3 outlined the operation of the housing market and the residential land market. This section focuses on the pricing within these two different but related markets. Before doing so it is important to note key differences between the housing market (and the residential land market in particular) and other markets in say stocks and shares or washing machines: houses and residential land are very expensive, infrequently traded and complex goods. This means that specialist advisors, such as valuers, play an important role in interpreting market signals, especially price signals, and use specialist calculations to do so.

4.1 Pricing housing

When it comes to pricing (or valuing) houses, this is usually done using the ‘comparison method’, by observing what similar houses have recently sold for nearby. New build homes are valued by taking in to account the value of similar new-build homes in the vicinity. However, the value of second-hand homes is also important. This is because new-build homes are competing with second hand homes for buyers, and buyers will take into account the value of second-hand homes when deciding what they wish to pay for a new build home. There may or may not be a premium for new build homes, depending on the characteristics of the local housing market and the characteristics of the new build homes. Unlike the residential land market, transaction prices in the housing market, for both existing and new build houses, are recorded in a publicly accessible register.

An important distinction between the residential land market and the housing market relates to substitutability. Two similar houses in a locality are more substitutable for one another than two similar pieces of development land. This is because houses are generally quite comparable; one terraced house is much like another. This means that their prices will be comparable, too. However, development sites may vary more widely in terms of their development potential, planning requirements and so on. Therefore, the exact form (and value) of any future development is uncertain, and this potential variation is reflected in often marked differences in price for development land. Imperfect substitutability between sites means that not only are prices for plots of housing development land more diverse, but it is also difficult to value them using the comparison method.

4.2 The land and structure components of house prices

The price of a house can be conceived hypothetically as comprising two components; the price of the land and the price of the structure. Some contributors to the literature make this distinction in order to argue that it has been increases in the land price component which have been 'driving' house price increases (see section 1.3). However, house purchasers neither think about the price of a home in terms of these two postulated components, nor do they negotiate the purchase price of a house by separately estimating the price of the land and price of the structure. In the purchasers' eye and in transactional fact, a house is a single asset (combining the land and structure) and it is valued, priced and transacted as such.

Of course, that is not to say that the land component of a home has no value on its own. Someone could purchase a home based on the value of its underlying land with the intention of demolishing the existing structure and building a new home. However, this would not be a purchase of the land *component* of an existing house, but rather a purchase of housing development land.

Therefore, while it is possible hypothetically to value the land component of a house by subtracting the estimated cost of its construction from the total value of the house, this is an artificial exercise. There is no pure market in the land *component* of a house, so these values cannot be directly observed in the market, but can only be deduced according to the assumptions of the residual theory itself.

If these implied land price components of house prices are used as a proxy for housing *development* land prices, it can obfuscate understanding of the relationship between house prices and residential land prices. For example, if the land price component of house prices was found to be rising over the past few years, and this was regarded as evidence that rising land prices were 'driving' rising house prices, this would be to potentially introduce a confusing suggestion of causation. It is not the land *component* of existing house prices which *causes* house prices to be high, but rather the shortfall in supply of residential land and, therefore, the supply of housing, relative to demand-side factors.

However, theoretically disaggregating the value of residential land and the value of the structure can be helpful for thinking about the relationship between the supply of housing development land and house prices. For example, Davis & Palumbo (2008) argue that land for development may be supplied relatively inelastically compared with the structures on the land (e.g. in metropolitan areas). That is to say, it may be easier to supply housing structures in response to increases in demand for houses than it is to supply the housing development land on which those structures need to be built. From this, they conclude that:

“In areas where most of the value of housing is accounted for by the value of land, new housing arguably is relatively inelastically supplied, and house prices (but not quantities) will likely respond to changes to demand. In areas where most of the value of housing is accounted for by the replacement cost of structures, changes to demand will likely affect the quantity of structures, but not their price.”

(Davis & Palumbo, 2008: 353)

Therefore, thinking about the theoretical proportion of house prices comprised by land points towards the role played in *the supply of housing development land in house price growth*. Of course, price and supply are two sides of the same coin: if the price of residential land rises it signals that residential land supply is insufficient to satisfy housing demand at any lower price.

4.3 Pricing housing development land

Housebuilders want their businesses to be profitable through the delivery of new homes. Therefore, when formulating bids, they will estimate how much they can pay for land, given anticipated house prices, construction costs, finance costs, transactions costs (legal, estate agency, etc.) and regulatory costs (cost of applying for planning permission and the share of the site that has to be allocated to government uses via planning obligations and infrastructure levies).

This leads to a valuation technique called the ‘residual method’. This method can be simplified in the following equation:

$$\begin{array}{r} \text{Anticipated value of the completed development} \\ \text{less} \\ \text{the anticipated cost of delivery including the housebuilder's profit} \\ \text{equals} \\ \text{housing development land price} \end{array}$$

The anticipated value of the completed development is estimated by examining recent sale prices of similar houses in the locality. The housebuilder’s profit is usually assumed to be a percentage of the value of the completed development. The cost of delivery includes the construction cost and the cost of planning obligations payable to the local authority for the delivery of public infrastructure (including affordable homes) when planning permission is granted.

Once housing development land has been purchased, the price is fixed. Any shifts in the value of the completed development or cost of delivery between land acquisition and sale of the completed

houses will be reflected in changes to the housebuilder's profit. The residual method, therefore, has the dynamics shown in table 1.

Table 1: Residual land valuation method dynamics scenarios

Anticipated Value of Completed Development	Actual Sale Price of Completed Development	Anticipated Delivery Cost	Actual Delivery Cost	Housebuilder's Profit	Land Value
Pre-Development – prior to agreeing the price to be paid for the development land					
Decrease	N/A	No change	N/A	Decrease	Decrease
Increase	N/A	No change	N/A	Increase	Increase
No change	N/A	Decrease	N/A	No change	Increase
No change	N/A	Increase	N/A	No change	Decrease
Post-Development – after agreeing the price to be paid for the development land					
N/A	Higher than expected	N/A	No change	Increase	No change
N/A	Lower than expected	N/A	No change	Decrease	No change

Table 1 illustrates the *direction* in which profit or land value moves in response to changes in development value and delivery cost, but there is another important dynamic too: the *gearing* effect i.e. the level of the housebuilder's profit and the value of the land relative to the value of the completed development and the cost of delivering it.

The land price and, once the land has been acquired, the housebuilder's profit are relatively small residual sums compared to the larger development value and delivery cost. This means they are volatile; small shifts in total development value or delivery cost can lead to relatively large fluctuations in land price and housebuilder's profit. This means that housebuilders can therefore make significantly higher than expected levels of profit if the value created by the development turns out to be higher (or the delivery cost lower) than anticipated when the land was purchased.

Conversely, housebuilders can make significantly lower than expected levels of profit if the development creates less value (or costs more to deliver) than anticipated when the land was purchased. It takes a long time, stretching frequently to years or even decades, to develop and build out sites. During that time, economic recessions, financial crises and other more modest events may easily adversely affect the 'anticipated' elements in the residual calculation. Such riskiness and long-term uncertainty, and the associated risk of volatility of housebuilders' profit, are an additional factor that housebuilders consider they need to be compensated for.

These risk-related considerations (uncertainty during the development period and the geared nature of the profit) must be considered when bidding for land. In the market, housebuilders compete with

one another to buy housing development land and the highest bidder usually wins. The residual method is a way of showing that housebuilders behave rationally when bidding for land. If the residual calculation is unattractive or other more profitable opportunities exist, then the bid will not proceed. Even if it does, there is no guarantee that it will win out in competition with other bids.

There may be occasions when housebuilders make optimistic assumptions about the value of the completed development or the delivery cost in order to outbid competitors. However, over-optimism is unlikely to predominate in land price determination. Of course, different developers are likely to have more or less optimistic views at any point in time regarding future market conditions. Yet, this does not mean that the optimists' price bids always determine the market value of land, because persistent optimists will come to grief when market conditions fail to meet their excessive expectations while wiser buyers continue to trade profitably. Moreover, optimists are unlikely to buy all the available supply at any point in time. Nonetheless, there can be times when a 'herd' behaviour of over-priced bids creates a price 'bubble', which will subsequently subside in a market crisis; though such events tend to be relatively short-lived.

However, there can be situations where it is rational for bidders to pay seemingly high prices for land, especially if they spot regulatory or policy weaknesses. For example, housebuilders might reduce their estimate of the price impact of planning obligations in the hope that they can negotiate with the local authority to reduce these costs after the land has been acquired (Sayce et al, 2017). This practice has taken place in London and the south of England over the past few years in relation to affordable housing, due to housebuilders and landowners exploiting weakly drafted English planning policy (Crosby et al, 2013; Crosby & Wyatt, 2016). The relevant National Planning Policy Guidance on viability was redrafted in 2018 in an attempt to address this problem (MHCLG, 2018).

4.4 Development and the uplift in land value

Private housebuilders tend to pay significantly more than the price of the land taking account only of its current use. This is demonstrated in the example of greenfield agricultural land which has received planning permission for a higher value residential use, thereby increasing its value from, say, £20,000 per hectare in agricultural use to, say, £1,000,000 per hectare taking account of its future development to residential use. (The actual uplift will depend on location, type of development, planning status and wider economic conditions).

This increase in value reflects the fact that once planning permission is granted, the planning risk is significantly reduced and this reduction in overall development risk manifests in an increase in the price of the development land. Even if planning permission has not yet been granted, but there is a reasonable prospect of planning permission being granted in the future, this potential for

development will be reflected in a market land price which is higher than the value of the land taking in to account its current use alone.

4.5 The residual pricing model vs. the price of development land

Land price is not simply a function of how much to pay to bid the land away from its existing use, but also how much to pay to bid the land away from other potential *competing* uses. Therefore, although the 'land as residual' pricing method is understandably widely accepted, it cannot reasonably be extended to the overall land market because the market pricing mechanisms involve intense, pro-active bidding for land by purchasers in competition with other bidders and potential uses. This process includes inducing landowners themselves to sell, as they will have their own reservation prices below which they will continue to hold onto the land.

It is important to emphasise that a residual calculation is simply a *method for pricing development land* which may produce various results depending on people's expectations. When land is sold, all bidders may use the residual approach when formulating their bids, but only one bid wins. The actual price (or value) of development land is simply that which is eventually agreed between the buyer and the seller in a competitive market. Thus, the residual method for pricing land is purely a *pricing model*, into which bidders plug their own assumptions and expectations regarding market conditions; whereas the actual *price* of development land is what has been paid to bid land away from other bidders/uses.

5 Land supply, housing supply and the price response

Having set out the fundamentals of how the housing market works, how the residential land market operates, and how land and housing is priced, the next section examines key market interaction issues. These include the relationship between pricing signals and time, the role of housebuilder behaviour, the impact of the constraint on the supply of housing development land on housing delivery and house prices, and the role of planning regulation.

5.1 Price signals and time lag

A shift in demand for housing will affect both house prices and residential land prices relatively swiftly. Changes in demand for houses can quickly change house prices and, so, lead to rapid changes in housing development land prices.

However, a shift in the supply of residential land will affect house prices relatively slowly. This is due to one of the key characteristics of the housing development process mentioned in section 3: namely, that it takes a long time. Changes in planning policy for a locality can take years or even decades, then it can take further years to obtain planning permissions for specific sites and construct

and deliver new houses to the market. Consequently, the release of more housing development land can take a long time to feed through to an increase in housing supply.

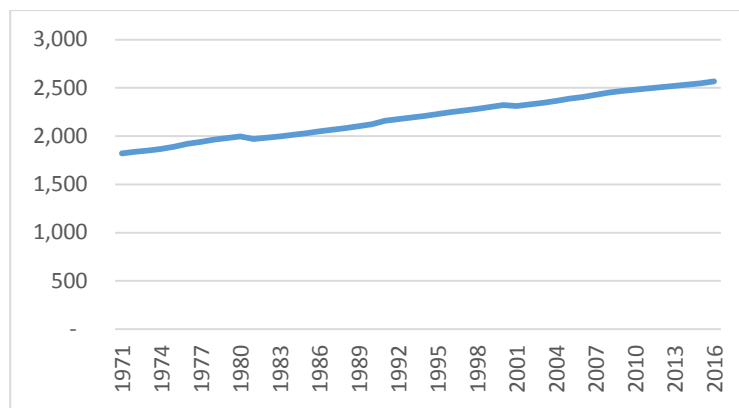
Even then, the increased supply of new housing will only be a small proportion of all housing that is on the market, which includes existing houses as well; meaning that a noticeable house price impact will only occur after a long time:

“Land supply can affect house prices much more in the medium and long terms than in the short term, so it would require not only substantial land release on a national scale, but also a consistently sustained policy change, to achieve a significant effect on house prices. If such a change were achieved, it would not only directly affect land supply, it would also modify expectations about future house prices and therefore the demand for housing.”

(Department of the Environment, 1992: 51).

Economists' housing models explore *how much* additional supply would be required to have an impact on house prices (e.g. Bramley, 1993; NHPAU, 2007; Meen, 2011). Evidence from these models suggests that a very large land release would be required to have an impact on house prices in the UK. Indeed, any impact would be likely to vary from sub-market to sub-market. Increased residential land supply may induce other effects such as larger houses, larger plots, better quality houses, reduced housing density and more inter-regional moves (Department of the Environment, 1992). These effects would reduce any impact on house prices deriving from increased residential land supply.

The annual increase in the stock of housing in Scotland has averaged a lowly 0.7% since 2000, partly because of a lingering impact since the 2008/9 recession. However, the extra stock affects outcomes at the margin and, in any case, cumulatively comes to constitute a large part of the stock. For example, the total stock (supply) of Scottish homes has risen by a substantial third over the past forty years (see Figure 3), through sub-divisions and new building, as relatively small annual net additions have accumulated. However, that has been insufficient to keep up with burgeoning demand. So, as a result, prices have risen sharply over the ensuing years, as noted earlier.

Figure 3: The Scottish housing stock 1970-2017 (thousands)

(Source: ONS data)

If the housing stock had increased at more than the mediocre annual average that it did over the past 20 years, especially in areas of high demand, prices would have been more affordable and people's housing conditions much improved. More housing demand would have been satisfied with those new homes rather than choked off by rising prices.

5.2 Housebuilder behaviour

Some of the policy literature argues that the profit-seeking that motivates housebuilder behaviour helps to prevent the supply of new housing coming forward at levels sufficiently high to reduce house prices. For example, Letwin (2018) argues that housebuilders only build out their development sites at the rate at which new homes can be absorbed in to the local market without negatively affecting prices. According to research by Adams and Leishman (2008) if demand at the point of build out was in excess of that anticipated when the purchase price of the development land was agreed, then "prices are quickly increased or incentives dropped" (as cited in Bentley, 2016: 31); build out rates would not be affected. Housebuilders would instead be motivated to capture the greater profit opportunity. According to Bentley (2017: 32), housebuilders are 'price-takers not price-makers'.

However, while this may be true for some housebuilders in specific market contexts, there is little evidence that house prices of entire housing markets are being systematically controlled by housebuilders through the control of new supply. According to a 2008 report into homebuilding in the UK by the Office of Fair Trading (OFT), there was "little evidence of competition problems with the delivery of new homes in the UK", and "no evidence that individual homebuilders have persistent or widespread market power or that they are able to restrict supply or inflate prices" (OFT, 2008: 6). This is because of housebuilders competing with each other, landowners withholding land from them, the threat of new housebuilder entrants to the local market, people choosing to

buy in other locations where prices are more favourable, and existing homes for sale in the local housing market. Typically, existing homes represent most of the purchase options for buyers, so the prices of existing and new homes ‘constrain each other’. In order to be able to control new supply within a housing market area, a housebuilder would need to have almost all of the area’s development sites. That would be expensive, hard to achieve and involve an unwise lack of market diversity. Examples of high local concentrations of new homes from one supplier were found by the OFT to be “scarce” and to “account for a small fraction of the total supply of new homes” (OFT, 2008: 6).

5.3 Land supply as the binding constraint

In recent years, economists have been looking at growth trajectories of house prices over the long-term and developing models in response to the empirical evidence (Davis & Heathcote, 2007; Grossman et al, 2017; Grossman et al, 2018; Knoll et al, 2017). These studies have the added benefit in a UK context of involving price studies of other countries, which makes us aware that these problems manifest themselves elsewhere.

Long-run house price changes in the USA and the UK both show a pattern of house price trends that were virtually flat from the nineteenth century through to the middle of the twentieth century but then sharply rise from then onwards. This has been attributed by a growing number of authors to an increasing shortage of development land in the face of secular rises in living standards.

Over the past fifty or so years, with the gradual switch to economies dominated by services rather than manufacturing, the economic advantages of certain large city regions have grown, while those of many traditional manufacturing areas have stagnated or declined. Unfortunately, at the same time as this shift in the geography of economic activity, the transport innovations that had kept on opening up new areas for housebuilding for most of the twentieth century up to the 1970s began to tail off. Instead, since then congestion has grown, making long commutes less desirable. The consequences are escalating land prices and house prices in better-located places.

Urban policy has not helped. In England, where it is well documented, and in parts of Scotland, planning policies have created restrictions while there have been limited improvements in transport infrastructure in recent decades.

Such dynamics suggest that the quantity of available development land in places where it is needed is the item to focus upon, taking into account these new configurations of transportation and economic possibilities.

5.4 Direction of causation?

Housebuilders have to buy land prior to selling homes. So, in this context, it looks as though land prices are driving house prices. But it has to be remembered that housebuilders' bids for land are based on their own forecasts of the prices at which they sell the houses they plan to build on that land. In this latter context, it looks as though house prices are driving land prices. Hypothetically dividing up the proportion of house prices contributed by the land component and the structure component does not support the conclusion that house prices are high because the value of the underlying land component is high. In this context, the land component is being used as a proxy for the price (and, therefore, supply) of housing *development* land.

So, is it possible to identify a direction of price causation? Formally, the answer is no because all of the factors influence price and output outcomes *simultaneously*. The economist, Alfred Marshall, used a telling metaphor suggesting the roles of demand and supply in determining market prices are like the blades of a pair of scissors, both are required to produce the outcome. So, to say that one factor is the 'cause' is erroneous. They all play a part. For example, it is expensive to live in central Edinburgh because many people want to live there and that keeps land values high. But that is to look at the issue from only one dimension. The land area of central Edinburgh is small and most buildings and landscape in it are preserved, so the lack of space (land) is a key factor as well.

A more interesting question relates to market dynamics. Decreases in house prices could occur if demand was suppressed, as it is when mortgage interest rates rise or when a recession dampens earnings and threatens jobs. Few would regard such demand effects as desirable. Perhaps more desirable are increases in supply, which require more land or building at much higher densities. If more residential land was available, more homes could be built which could lower house prices and land prices simultaneously, though migration and other feedback effects make actual estimates complex (NHPAU, 2009).

5.5 The role of planning

Economists' models suggest that the supply of housing development land needs to be significantly increased so as to increase the supply of housing and make it more affordable over the longer term. As the planning system regulates the supply of development land, it therefore needs to play a role in achieving this. However, this is not to argue that we must therefore necessarily introduce sweeping deregulation.

Planning plays a very important role in our economy and society; it helps to control and redistribute the negative externalities and risks arising from new development, it helps to protect property values, it helps to create value in areas where development is to be focused by policy, it helps to

protect and conserve our natural environment, it helps to secure the delivery of affordable housing and other public goods which would not be provided by the market alone.

New housing development can be highly controversial, with the release of residential land for new housing supply through the planning system an extremely political matter. Planning systems in the UK therefore provide a space in which competing political demands on land use are articulated and mediated. Planning is not simply a technical process.

It is easy to simply 'blame planning' for the current shortfall in residential land and, therefore, housing supply. No doubt, planning has played a part. However, land development needs to be planned for a variety of reasons. New housing developments require proper support with new infrastructure and should be integrated into communities in ways where potential negative externalities are appropriately managed. The benefits of extra housing have to be demonstrated with rational arguments and the options laid out, so that people can understand the trade-offs required and overall advantages of change. For the reasons stated above, all that takes time.

6 Conclusion

The housing market and the residential land market are two distinct but related markets. Landowners and housebuilders operate in the residential land market; housebuilders compete with one another to purchase land from landowners. Housebuilders compete with each other in order to secure buyers for new-build houses, and they are also in competition with sellers of second-hand homes.

The relevant housing market comprises the whole stock; existing homes and new homes. The demand for houses is affected by income, wealth, cost of houses, availability of finance and expectations about the future. It varies from place to place because attractiveness and accessibility are key drivers. The supply of houses comes from existing owners and from housebuilders. The amount of new homes supplied, including their type and location, depends on profitability which is determined by costs and selling prices. Selling prices are determined by the current relationship between supply and demand, including buyers' and sellers' views of future market conditions. The supply of new housing in to the housing market is dependent on the supply of land in the residential land market.

Residential land is therefore a key input in to the supply of new housing. Housebuilders compete with each other to secure sites from landowners, each of whom has a degree of monopoly control over the supply of land because of the importance of location. The supply of land is also controlled by the planning system. In order to secure a development site, a housebuilder has to outbid

competitors which could include other land uses. Housebuilders use the residual method for determining the bid for land; this is dependent on assumptions about the future cost and value of the proposed development and so the bids may differ depending on the bidder's expectations. However, there can only be one successful bid.

A house is a single asset comprising the land and structure and it is valued, priced and transacted as such. However, it is useful to segment hypothetically the price of a house into its land component and the structure itself in order to look at the relative importance of land. Thinking about house prices in this way helps when considering the relationship between the supply of residential land and house prices. If the land component is gaining in value as a result of house price increases, then this suggests that residential land is supplied less easily (i.e. more inelastically) than structures.

In the context of high (or unaffordable) house prices, it is therefore the supply of residential land which is the key factor and, indeed, the binding constraint. An increase in the supply of housing development land will result in an increase in the supply of housing which results, other things being equal, in a decline in the price of housing. Due to the fact that the development process takes a long time, any such impact is slow. Furthermore, economists' models suggest that a very significant increase in the supply of development land would be required to have a noticeable impact on house prices.

To conclude, there is not a single or one-way direction of causation between land prices and house prices (or vice versa). This is because demand and supply factors influence price and output outcomes *simultaneously*.

Nevertheless, the following statements can be made:

1. *The housing market affects the land market rapidly.* Changes in the demand for houses alter house prices as housing market activity picks up or slows down. Housing development land prices adjust swiftly, encouraging or dampening the incentive to supply development land.
2. *The land market affects house prices more slowly.* Changes in the supply of housing development land alter land prices quickly, but influence house prices more slowly due to building lags.

This indicates that a policy that reduces housing development land prices by increasing land supply in a competitive environment would reduce house prices over the long-term. However, to do so, the increase in land supply would have to be sufficient to absorb both the long-term increases in housing demand caused by rising living standards and the stimulus to demand generated by the more

plentiful housing supply itself. This would alter the present distribution of the housing stock and relative house prices across the Scottish landscape

The interaction of supply and demand forces and their effect on the price of residential land and housing do not, in themselves, conflict with a desire to increase land and property taxation or land value capture. Such policy interventions are jointly aimed at taxation of the wealth held in land and property and directing part of land value increases (betterment) to the provision of local infrastructure. Their viability within broad limits is, in principle, a political issue.

Appendix A

The evolution of the economic theory of land rent

The evolution of the economic theory of land rent is important context for the topic of this paper, because it is in the evolution of this theory that we can trace the evolution of the theory of the relationship between residential land prices and house prices, which still influences thinking today. The two main historical economic theories which seek to explain this relationship are Ricardian rent theory and Neoclassical rent theory.

Ricardian rent theory came first and was based on some very simplified assumptions; it is from Ricardian theory that we get the 'residual model' for the valuation of housing development land discussed in section 4.2. Neoclassical rent theory transformed Ricardian theory by introducing greater complexity to the Ricardian model.

Ricardian rent theory

The influential British political economist David Ricardo (1772 – 1823) wanted to understand the impact of the protectionist 19th century Corn Laws (i.e. tariffs on imported food and grain), with a key question being whether or not the price of corn was being inflated by the high land rents (or prices) charged by landowners. Ricardo concluded that it was not and that, in fact, it was high corn prices which were inflating land prices.

Ricardo based his model on two simplifying assumptions: a) that there is only one use to which land could be put (e.g. corn growing), and b) that the supply of land is absolutely fixed. Within the confines of this simplified model, Ricardo argued that the demand for land is derived from the demand for corn and that because the supply of land is absolutely fixed it could not therefore change in response to changes in demand for corn. Therefore, for Ricardo, the price of land could not be affected by changes in the supply of land and, therefore, the price of land was purely determined by the demand for corn. From this he concluded that the price of land was high because the price of corn was high.

In this model, if we transpose 'corn' for 'housing', then it implies that the price of housing development land is high because the price of housing is high, and not vice versa. In other words, according to the Ricardian model, in the context of a single land use and total inelasticity of supply, house prices determine housing land values and not the other way around. However, as we shall see, this is a 'short term' calculation which takes a snapshot of the current price of the land and does not take in to account the longer-term dynamics of the relationship between land supply and house prices, and takes no account of the fact there can be more than one land use.

Neoclassical rent theory

Neoclassical land rent theory transformed Ricardian rent theory by replacing its two main simplifying assumptions. As Evans (2004: 14) explains, the neoclassical approach assumes that there are at least two uses to which land can be put, e.g. growing corn or growing potatoes. Furthermore, land currently used for growing corn can be switched to potato growing and vice versa. Therefore, the supply of land for each of these uses is not fixed but can shift in response to changes in demand for either product. There is equilibrium in the market as long as the rent (or price) payable for each land use is the same.

If there is an increase in the demand for potatoes with no change in the demand for corn, then some land would change use from corn growing to potato growing to meet the increased demand. This would reduce the amount of land available for growing corn and, therefore, would reduce the amount of corn available to the market, thereby pushing up corn prices. Furthermore, the increased demand for 'potato land' and the reduced supply of 'corn land' would act to inflate land prices for both uses, so that the market would reach a new equilibrium at a higher level of overall land price.

However, in this model the increased price of corn is not solely due to the reduction in its supply derived from the reduction in the amount of land available to grow corn. The neoclassical model suggests that a reduction in the supply of corn land pushes up the price for this land, thus increasing the costs of corn production, and this increased production cost further inflates corn prices. Therefore, according to the neoclassical model, increased land prices that result from reduced land supply can inflate corn prices. The direction of causation described by Ricardian rent theory (that high corn prices cause high corn land prices) can be reversed when the supply of land is not fixed and not in single use.

If we transpose 'corn' for 'housing' and 'potatoes' for any other land use, then under the neoclassical model it is possible for the price of housing to be high because the price of housing development land is high. This is because the supply of housing development land can change between uses and also within use.

Therefore, according to the Neoclassical model, the price of housing development land is not *solely* determined by the demand for housing but can also be influenced by changes in the relative supply of and demand for housing development land.

In the UK, changes in the relative supply of development land are regulated by the planning system. As argued by Cheshire and Sheppard (1989: 471), the restriction of development has inflationary effects on both housing land prices and house prices:

“If development control [planning] effectively restricts the supply of new residential development then it raises the prices of houses. Since builders as a result can get higher prices for houses, they will pay more for land. While, therefore, the high land prices do not cause high house prices, both are caused by the restriction of development.”

Theoretical implications of rent theory

The land rent theories described above have the following theoretical implications for the relationship between housing development land prices and house prices:

- a) An increase in the demand for housing relative to static supply of housing development land would result in an increase in house prices, which would increase the price of housing development land. The same relationships apply in the context of a decrease in the demand for housing i.e. house prices and the price of development land would also decrease.
- b) An increase in the supply of housing development land relative to static demand for housing would result in a decline in housing development land prices (and thus the production cost of new homes), and this would decrease the price of housing. The same relationships apply in the context of a decrease in the supply of housing development land i.e. the price of development land and the price of housing would increase.

Although the absolute supply of land in Scotland may be fixed, it is possible to use this land for different uses and thus alter the quantity supplied for each use. That said, planning controls mean that shifts in supply are not rapid. Furthermore, landowners may behave in ways that slow shifts in supply too. They might for example, decide not to release farmland for development today because they believe that it might be more profitable to do so at a later date.

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