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Mobility Constraints and Cycles in the Owner Occupied Housing Market

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ABSTRACT

Very little empirical attention has been given to the mobility constraints linked to accessibility to and upgrading within home ownership. Both are central to the operation of the housing market and can be seen within a framework of housing careers. This paper places them also in the context of changing housing market conditions and in particular the role of housing cycles. The research simulates, in purely financial terms, the behaviour of the average first-time buyers in each region of the UK over three decades. The analysis finds the accessibility mobility constraint is more psychological than financial but is also dependent on interest rates and the scale and duration of market downturns. The analysis of the upgrading constraint through housing cycles demonstrates that the ease of moving in the upturn fuels a boom but the subsequent inabilities to accumulate the capital necessary for such a move brings a long muted recovery.

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Mobility constraints; first-time buyers; trading up; upgrading; housing cycles

Introduction

Aspirations to own a home have been rooted firmly in the British psyche (Kemp 2002). Indeed the UK home ownership rate more than doubled and reached its peak of 70.9% in 2003 from 32% in 1939 (DCLG, Department for Communities and Local Government 2018). This trend was driven by the perceived long-term financial (Mostafa and Jones, 2019; Ball 2006) and non-financial benefits, including the scope to live in a comfortable home (CML 2010; Saunders 1990). Nevertheless potential first-time buyers (FTBs) face significant financial constraints – notably the mortgage down payment based on the prevailing loan to value ratios set by banks (Chiuri and Jappelli 2003; Ortalo-Magne and Rady, 1999). Low-income FTBs are also likely to be constrained by the loan to income ratios of banks. Once home ownership has been achieved this is not the end of the journey for most households as they usually anticipate moving to a better quality/larger home in the future (Jones and Watkins 2009). Such a subsequent move is also subject to the financial lending criteria of banks. The ability of households to purchase for the first and second time in both cases is also dependent on house prices relative to incomes at any point in time, and their faculty to do so collectively shapes the market.

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The role of income and wealth constraints have received much attention in explaining housing market trends but the focus of the paper is on the under-researched mobility constraints. Mobility constraints are defined here as financial restraints on households' moving home, as a result of market price cycles including associated variations in bank lending criteria with respect to loan to value ratios. This is important because the UK like many countries has a history of housing market cycles. The 1980s boom, 1983–1990, was followed by a housing market downturn over the period 1991–1995. There then followed a decade long upswing, 1996–2007, that became a boom from 2002. The housing market turned down after the global financial crisis (GFC) with an immediate fall in house prices followed by stagnation (Jones 2016).

There are variations in loan to value ratios applied by banks depending on the point in the housing price cycle. Banks shift from lending policies that collectively under-price risk in a boom with very generous credit rationing rules to the reverse, in a downturn where over-pricing of risk substantially lowers the mortgage terms available (Jones and Watkins 2009). These changes in financial terms exacerbate the house price cycle effects.

Mobility constraints can be linked to the market risk of home purchase, as there is the possibility that the property value might fall in the future leading to capital losses. This market risk is most severe in the immediate years after purchase given the up-front payment involving transaction costs and often relatively low equity held in the home. This risk in relation to FTBs is often interpreted as a mobility constraint that arises because households perceive their anticipated length of stay as being too short to justify buying. It is argued that households with expected high mobility (i.e. a short length of stay) choose to rent, even if they can afford to buy to avoid possible losses when they have to move (Sinai and Souleles 2003; Bone and O'Reilly 2010; Linneman and Wachter 1989). This represents one dimension of the mobility constraints in the housing market.

This view can be described as “perceived wisdom” and the corollary is that these barriers to home purchase are also deemed to deter regional mobility (with consequences for the labour market and macroeconomic efficiency) as potential owners will be deterred to undertake a short-term move. There is limited empirical evidence and there is the perception that the wide disparity between house prices in the various British regions has contributed to differential constraints on mobility. The UK government recently has encouraged the expansion of the private-rented sector (PRS) government as a means of enabling greater labour mobility (MHCLG, Ministry of Housing, Communities and Local Government 2019).

There is also another potential (upgrading) mobility constraint in the housing market that receives less attention, but is actually more important. Household moves are crucial to the operation of the housing market (Ngai and Sheedy, 2019), and such mobility is linked particularly to the adjustment of household space needs with the family life cycle. When home owners are unable to move home, via subsequent house purchase after say an initial move into the sector, this can create severe personal difficulties. If this is widespread then as such mobility dynamics at the core of the housing market it can significantly reduce transactions and stagnate house prices.

This study focuses on the role of these mobility constraints in the past four decades by quantifying them and examining their role in the housing market. It distinguishes between “accessibility” (to home ownership) and the “upgrading” constraints. To assess the accessibility constraint the study calculates how many years it took the average

FTBs in every year from 1975 to 2011 to break even in the 11 regions of Britain. It also explores the components of this process by calculating the breakeven year after ignoring the impact of capital gains. To undertake these tasks the study applies a discounted cash flow (DCF) approach. The upgrading constraint is considered via the underlying subsequent financial equation of FTBs and the time it takes to make the second move within the sector. Given the potential for spatial differences the paper also considers regional variations in these constraints.

The structure of the paper is as follows. The next section examines the microeconomics of housing careers and places mobility constraints in a framework embracing other constraints. The latter part of the paper presents the simulation analysis that assesses the “accessibility” to home ownership and the “upgrading” constraints in turn. Each section explains the research methods applied followed by the results. Finally, there is a discussion and concluding section.

Housing Careers and the Housing Market

The predominant housing tenure in the UK is owner occupied representing 63% of all households in 2018. This figure represents a fall from 71% in 2003. The difference reflects a growth in the PRS since the millennium that has seen it rise to 19% of total households from single figures. Besides these two tenures the proportion accounted for by social housing, let by local authorities or housing associations, has experienced a slight decline over the last two decades and in 2018 was 17% of all households (Jones 2016; Stephens et al. 2019).

The role of life cycle and household mobility was first identified by Rossi (1955) over a half a century ago. There have been many academic studies in this tradition, in the UK recent studies include Clapham et al. (2014) who look at the housing pathways of young people. The framework for this paper is an adapted version of the stages of a typical housing “career” in the UK based on family life cycle by Jones and Watkins (2009). It presumes that ultimately a household wants and becomes an owner occupier, even though there may be a preference to rent as a young adult. The model is not a complete representation of the dynamics of the housing system as not all households follow this path. It starts with a person who becomes a household when leaving his family home and then stays in a rented property (renting stage) until he/she purchases a house that is most likely in the bottom end of the market (as a first time buyer). When the households gets through the child-bearing stages of the family life cycle, households trade up in the market until the children leave home and then the “empty nesters” trade down. FTBs are a distinct segment of housing demand comprising low-income and young professional households. This family cycle model of household mobility does not incorporate constraints that can present substantial barriers first to house purchase and then to adjusting to household demographic change once in the owner-occupied sector.

The barriers to home ownership extend beyond simply what can be referred to as the mobility constraint. Households who aspire to own face a mobility constraint and two financial constraints, namely wealth and income constraints. The process through which a prospective FTB would pass in order to get on the “housing ladder” is outlined below:

- (1) **Mobility constraint:** this arises when the expected length of stay is short and therefore households see renting as a more practical option.

- (2) **Wealth constraint:** if the mobility is not an issue and expected length of stay is perceived as long enough, households must have sufficient savings to pay the down payment and transaction costs (owning costs) or otherwise keep renting.
- (3) **Income constraint:** based on the households' income, if the maximum mortgage loan is not sufficient to buy the target house then households should either downgrade (in terms of space, location or quality) or keep renting until they save sufficient money to be able to buy more expensive property.

Figure 1 develops a simplified first-time house buying process for a typical prospective FTB who aspires and can afford to buy via a mortgage loan. The given model is static and the buying process in reality is more dynamic and subject to changes in many key variables including the state of mobility, income, savings, required down payment, loan to income ratio and social status (as a couple could get on the housing ladder sooner than singles). Also in practice renting is not the only alternative to buying as younger households can stay longer in their parental nests until they save the money needed for buying. The simplified process assumes that the households' tenure options are limited to just buy or rent.

The wealth constraint represents the required cash to meet the owning costs including down payment and transaction costs. A number of studies have examined this wealth constraint that is partly a function of the loan-to-value ratio offered by the mortgage lenders at the time of purchase. This research finds that countries with a higher down payment observe lower owner occupancy rates among the young than in countries with lower down payment, and young households postpone home purchase until saving the required amount (Chiuri and Jappelli 2003; Ortalo-Magne and Rady, 1999). Linneman and Wachter (1989) find that in the USA financial liberalization (as in many other countries) in

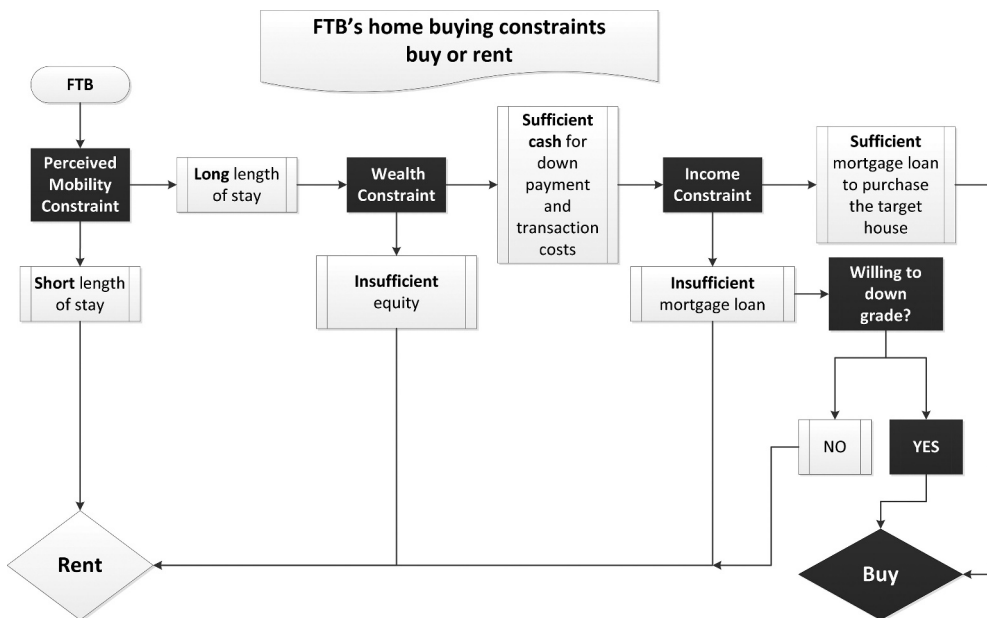


Figure 1. Buying constraints within a simplified house purchase process.

the early 1980s reduced these effects. Following the GFC the reversal of this trend led to pricing out FTBs of the housing market in the UK as well as many developed countries (Jones 2012).

The income or affordability constraint on home ownership has been the subject of a vast literature that it is unnecessary to review here. It covers alternative approaches to measurement including house price to earnings ratios, mortgage repayments as a percentage of income and “residual” incomes. To conclude, wealth and income constraints to home ownership have received considerable academic interest but the mobility constraint has been largely ignored, especially from a financial perspective.

In this career model the PRS acts as a “waiting room” for the ultimate move to owner occupation. Owner occupation is seen as offering greater pecuniary and non-pecuniary benefits. In purely financial terms xxxx calculate that owning has been more attractive than renting in Britain over the forty years from 1975. More generally Ball (2006) indicates that owner occupation offers security, tax free long-run capital gains and an ability to fashion and refashion the accommodation. These benefits are severely offset if a high premium is put on mobility.

Renting can be seen as less risky (Sinai and Souleles 2003) and a suitable (Bone and O’Reilly 2010) tenure choice for households with short expected length of stay. Sinai and Souleles (2003) explain that home owners are subject to price risk (fall in house prices) while renters are subject to rent risk (increase in rents). They see that for households with a short expected length of stay, renting would provide the less risky tenure choice. They also state that the tenure decision of a highly mobile household is the outcome of the perception of higher buying risk than renting risk. Böheim and Taylor (2002) find that private renters in the UK over the period 1991 to 1997 are found to experience the most residential mobility.

There is evidence of the impact of mobility on tenure choice in other developed countries. Ortalo-Magne and Rady (2002) find that a household in the USA with a long length of stay is more likely to own rather than rent. Goodman (2001) studies “equilibrium” housing demand for “stayers” in the USA, and finds empirical evidence that ownership is correlated to staying and renting is linked to moving. In Germany Schulz, Wersing, and Werwatz (2009) find empirical evidence that the probability to rent is higher for the households of shorter duration of residence due to the higher price risk and the substantial transaction costs of changing residence. They estimate that a decrease in expected length of stay by one year raises the probability to rent by 3%.

However, these studies tend to ignore the “waiting room” role of the PRS, certainly in the UK. In a country with a long-term rising house price trend such as the UK, renting could entail price risk in the long run as the increase in house prices would reduce affordability and increase difficulty of buying in the future. This leaves private tenants potentially paying a high percentage of their income in rent while saving for a deposit that is continually rising in real terms. There is a limited literature that examines the detail of these financial decisions.

Further the decision may also be influenced by the size of the deposit required meaning that high priced regions (assuming nationally set loan to value ratios) could suffer more from the mobility constraint than those with low average price. In the context of Britain the higher price regions are in the south – London, the South East, South West, East Anglia and East Midlands. This issue is compounded by the greater volatility in these four

regions and the greater “north–south house price gap” that widens in booms (Jones and Watkins 2009). The influence of such market forces on upgrading and trading up behaviour has also not been considered to date.

The Study

Mobile households can fairly estimate the number of years they would stay in a given residence but they cannot necessarily determine whether this number of years is long enough to make a rational buying decision or not. This raises the question of what is the average length of stay required in order for a household to break even and what key factors that might shorten or widen the years to breakeven. Shelton (1968) studied the USA housing market during the 1960s and finds that the economic aspects of whether to buy or to rent a home hinge primarily on the accessibility mobility family perspective of length of tenancy in the home. Shelton’s conclusions are plausible – that renting is less costly if the family is going to stay in a home for three and a half years or less. Unfortunately his calculations are flawed assuming very high transactions costs of 7% and more importantly the use of economic rent rather than market rent.

The home ownership “accessibility mobility constraint” is dependent on housing market conditions, so for the household planning a purchase it is more severe in periods of “expected” low house price inflation and least during rapid price growth. However, expectations may not happen and this in turn could lead to a subsequent mobility constraint (on the next move) when a household buys at or near the top of the market and then house prices fall. Overall then there are two dimensions to this mobility constraint, one that relates to expectations and the other to the actual breakeven time.

The next stage in a housing career as set out above is the move to a better home in the owner-occupied sector. The ability to pursue such a move is path dependent, partly a function of the household’s financial position in the original purchase. The ability to trade up through the market depends also on a range of other factors such as external support and housing capital accumulation. In other words a subsequent household move is a function of financial variables that provide a viable platform. The time taken to achieve this platform can be seen as a constraint on further mobility. In this paper we refer to this as the “upgrading mobility constraint”, expressed in years. As with the accessibility mobility constraint it is dependent on house price inflation and hence capital gain from the initial purchase. A period of rapid house price growth could quickly generate the additional capital for a deposit to permit a remortgaged move to a higher price house. On the other hand house price stagnation could have the reverse effect by stretching the capital accumulation period before a household could be in a position to move without external support or the injection of additional capital.

In this study we seek to quantify both these accessibility and upgrading mobility constraints, demonstrating how much they vary by region and stage in the house price cycle. The former is assessed by estimating the length of stay required for FTBs to breakeven in the sense that they could move residence without incurring losses. The latter is quantified by estimating how long FTBs require before they can afford to upgrade. In each case a “viability” point is reached releasing the constraint. The empirical assessments of the mobility constraints are now considered in the next two sections based on the “average” FTB.

Accessibility Constraint

Research Method

This study assesses the “accessibility mobility constraints” by assessing the historical average years to breakeven for house purchase by FTBs in each of the eleven regions in Britain over an extended period 1975–2011. This period covers three major booms and busts in the housing market.

The analysis is based on a DCF approach and the financial return is calculated from a buyer’s perspective by “dividing” the sum of present values of the annual cash differential between buying and renting “by” the initial outlay paid by the buyers. Using a financial model, it simulates FTB “cases” that represent the average purchaser with a variable-rate mortgage loan. It simulates 37 FTB cases in each region, 407 in all, that buy in every possible year over the period from 1975 to 2011.

In this way it calculates how many years it takes each FTB case to reach the breakeven point. The breakeven point is defined as the year in which FTB cases can resell the property without making gains or losses, or in other words when the average FTB case fully recovers the initial outlay. In terms of the financial model the breakeven year is the year at which the return reaches/exceeds the value of 1.0. The analysis includes the cost of buying and selling FTB property as well as other costs such as stamp duty fees and annual maintenance and insurance costs. It also includes the benefit of the interest tax relief but does not include the transaction costs involved in renting. The analysis is repeated excluding the impact of capital gains from the return. The details are given in [Appendix 1](#) and have previously been detailed in (Mostafa and Jones 2019).

The research covers the following eleven regions in the UK (less Northern Ireland):

-
- (1) North East (NE)
 - (1) North West (NW)
 - (1) Yorkshire & Humberside (Y&H)
 - (1) East Midlands (EM)
 - (1) West Midlands (WM)
 - (1) East Anglia (EA)
 - (1) London
 - (1) South East (SE)
 - (1) South West (SW)
 - (1) Wales
 - (1) Scotland
-

Data

The analysis uses the “prevailing” nominal “regional” house prices paid by FTBs and loan to value (LTV) ratios on mortgages provided by the Office of National Statistics (ONS), as it is the only data that goes as back as 1975. Annual average mortgage interest rates and historical tax relief on mortgage interest are provided by the Halifax fact book in 2012. The source of mortgage interest rates data is the CML and the Bank of England. Income tax data are sourced from the Inland Revenue. Stamp duty limits and rates (introduced in 1980) are collected from the Stamp Duty Factsheet (CML, Council of Mortgage Lenders 2011). The rental values and rental yields applied are explained in [Appendix 1](#). [Appendix 2](#)

provides an example of the breakeven analysis using the DCF approach for a given FTB case.

Analysis of FTB Breakeven Periods

Out of the 407 average FTB cases across the different regions of the UK buying between 1975 and 2011, [Figure 2](#) records that 66.2% reach the breakeven point in only one year, 16% in two years and 8.1% in three years. In other words, the vast majority of average FTB cases or 90.3% of them require between 1 to 3 years in order to reach their breakeven points. Only 6.2% of the FTB cases need between 5 to 11 years to breakeven.

The regional picture given in [Table 1](#) shows a pattern over time across all regions consistent with the national. Over the first housing cycle, the regional value in 1980 (one year prior to the price peak) stands between 4 and 6 across all regions except for Y&H at 2. At the peak in 1981, the values remain high at between 2 and 6. The second housing peak witnesses very high breakeven times in the southern regions, including EA, EM and SW (to a lesser extent) that stand between 6 and 11 over the period from 1988 to 1990. The increase in values in these regions shortly before and at the price peak in 1990 can be attributed to experiencing multiple material price falls during the consequent housing downturn from 1991 to 1995. This bust period experienced extremely high interest rate hikes that amplified the cycle. However, from 1992 to 2006 the regional values all remain low, at 1. The third cycle maintains the same pattern with time to breakeven rising quickly at the price peaks in 2007 and 2008 but this time the rise is more widespread yet more muted than the other two peaks due to the very low interest rates that exist during this cycle. The exceptions are the regions of the East Midlands and the South West, with peaks of 6 and 5 respectively. At least a partial explanation is the sudden nature of the global financial crisis acting as an external almost uniform dampener on house prices in every region (Jones 2012).

The overall impact of these cyclical patterns is seen in the 37-years' simple averages for regions given in [Figure 3](#). For peripheral regions (N through to Wales in figure) the average stands between 1.3 and 1.5, with the WM at 1.8 years. In contrast the average stands between 2.2 and 2.5 years in the southern regions, the EM and EA, the figure

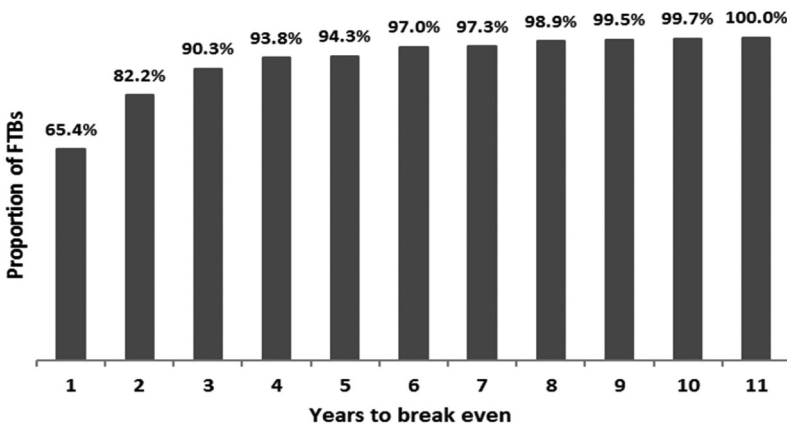


Figure 2. Distribution of years to breakeven for first-time purchasers.

Table 1. Years to breakeven in all regions from 1975 to 2011.

Year of purchase	Years to breakeven											Mean
	Lon	N	Scot	NW	Y&H	Wales	WM	EM	SE	EA	SW	
1975	3	1	1	2	1	2	1	2	2	3	3	2
1976	2	1	1	1	2	1	1	1	1	2	2	1
1977	1	1	1	1	1	1	1	1	1	1	1	1
1978	1	1	1	1	1	1	1	1	1	1	1	1
1979	2	2	4	1	1	1	2	1	1	1	1	2
1980	4	4	6	4	2	4	6	4	4	4	6	4
1981	3	3	4	3	2	2	6	2	3	2	3	3
1982	1	1	2	1	1	1	2	1	1	1	1	1
1983	1	1	1	1	1	1	1	1	1	1	1	1
1984	1	3	1	2	2	2	2	2	1	1	1	2
1985	1	1	1	1	1	1	1	1	1	1	1	1
1986	1	1	3	1	1	2	1	1	1	1	1	1
1987	6	1	2	1	1	1	1	1	1	1	1	1
1988	10	1	1	1	1	1	1	1	9	8	8	3
1989	8	1	1	1	1	1	1	7	9	11	10	4
1990	7	1	1	1	1	1	2	8	8	8	8	4
1991	5	1	2	1	2	3	6	6	6	6	6	4
1992	1	2	1	1	4	1	3	5	1	3	1	2
1993	2	2	1	3	2	2	2	4	2	1	2	2
1994	1	2	1	2	3	2	3	3	2	2	3	2
1995	1	1	1	1	1	1	1	1	1	1	1	1
1996	1	1	1	1	1	1	1	1	1	1	1	1
1997	1	1	1	1	1	1	1	1	1	1	1	1
1998	1	1	1	1	1	1	1	1	1	1	1	1
1999	1	1	2	1	1	1	1	1	1	1	1	1
2000	1	1	1	1	2	1	1	1	1	1	1	1
2001	1	1	1	1	1	1	1	1	1	1	1	1
2002	1	1	2	2	1	2	1	1	1	1	1	1
2003	1	1	1	1	1	1	1	1	1	1	1	1
2004	1	1	1	1	1	1	1	1	3	1	3	1
2005	1	1	1	1	1	1	1	3	2	3	4	2
2006	1	1	1	1	1	1	1	2	1	2	3	1
2007	3	1	1	3	2	2	3	6	3	3	5	3
2008	2	1	1	2	1	4	2	4	2	2	2	2
2009	1	1	1	1	2	1	1	1	1	1	1	1
2010	1	2	2	2	3	3	3	3	2	2	3	3
2011	1	1	1	1	1	1	1	2	1	2	2	1
Mean	2.2	1.3	1.5	1.4	1.4	1.5	1.8	2.3	2.2	2.3	2.5	1.8

reveals a general trend that, the regions with lower price rankings (and coincidentally with higher returns, see Mostafa and Jones (2019)) tend to have lower regional average break even periods.

The analysis as a whole provides strong evidence that timing of purchase makes a significant impact on the breakeven point. FTBs that purchase near or at a price peak experience a greater breakeven period than those purchase during or shortly after a downturn. The longer years to breakeven is also a function of the scale and duration of the consequent downturn. High interest rates as at the end of the 1980s were likely to delay the breakeven point, Nevertheless the long-term breakeven period over the 37-year study period remains only between 1 and 3 years for a vast majority of average FTBs in the different regions (90.3%).

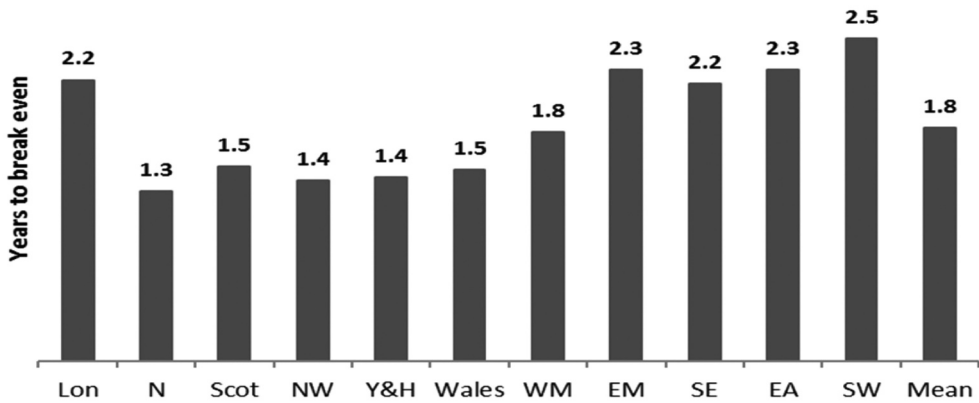


Figure 3. The 37-year average breakeven time by region.

Breakeven Periods Assuming No Capital Gains/Losses

The analysis above highlights the role of the housing market cycle in influencing breakeven points. This subsection assesses its importance by removing any capital gain/loss from the financial equation of the home purchase decision. This is an extreme case of the mobility constraint. Households will still generate intrinsic value or equity in their home by capital accumulation through their mortgage repayments. The research now estimates how long it took average FTB cases to breakeven when excluding capital gains. The financial benefits of home ownership then centre negatively with the variable interest rates and positively to the private rental value of the same property (as the main stream of cash inflows in the analysis). Since the above two variables have been subject to fundamental changes over the analysis period, it can be anticipated that the breakeven periods without capital gain will vary widely over time. [Table 2](#) shows the breakeven periods without capital gain by region. These breakeven periods display extreme values over the period from 1975 to 1991 and much lower values from 1992 through 2011. The all-regions' mean average remains extremely high between 9 and 16 from 1975 and 1992 and then falls dramatically to between 1 and 6 from 1992 and beyond.

The dramatic variation between the above two periods can be partly explained by the huge differences in the interest rates over the two periods, and more detailed analysis emphasizes the role of market peaks. In particular, high interest payments slow down building up equity and accordingly reduce the time to breakeven, an issue irrespective of region. Historically the impact of high interest rates was ameliorated by tax relief on mortgage interest payments, but this was phased out in the late 1990s at the same time as rates fell. Rent deregulation from 1989 and the subsequent rise of rents in the private rented sector also meant that owner occupiers saved greater imputed rents (cash inflows). Based on the above it is useful to separate the regional averages for the periods; 1975–1991 and 1992–2011. The resultant figures are given in [Figure 4](#). A comparison of the two sets of regional averages demonstrate a gulf in values but reveal (apart from Scotland) broadly the same regional ranking.

Table 2. Years to breakeven without capital gain by region from 1975 to 2011.

Year of Purchase	Lon	N	Scot	NW	Y&H	Wales	WM	EM	SE	EA	SW	Mean	Mortgage interest %
1975	14	14	19	14	15	15	16	18	16	15	18	16	10.5
1976	13	13	18	13	13	13	14	16	14	13	16	14	11.4
1977	10	12	17	8	10	12	12	12	12	7	13	11	9.9
1978	11	14	21	11	11	12	13	14	12	11	14	13	10.0
1979	12	13	17	13	13	13	14	14	13	15	15	14	13.8
1980	12	13	15	13	13	13	14	15	14	13	18	14	14.9
1981	11	12	14	12	13	11	14	14	13	17	13	13	14.0
1982	9	9	11	10	10	10	11	12	11	10	13	11	13.3
1983	8	7	6	8	9	9	9	10	10	9	11	9	11.0
1984	9	9	9	9	10	9	9	11	10	9	12	9	12.2
1985	9	7	7	8	8	8	8	10	10	9	12	8	13.0
1986	12	6	6	7	8	8	8	9	12	15	16	8	12.3
1987	15	6	5	7	7	7	8	10	15	17	17	8	10.3
1988	18	7	5	7	8	9	11	15	21	21	19	10	12.8
1989	12	4	4	5	6	7	9	15	16	20	18	8	14.4
1990	7	5	3	6	6	6	9	14	14	14	16	8	14.3
1991	3	4	3	5	5	4	8	11	6	11	11	6	11.4
1992	1	2	2	3	3	2	4	5	2	3	3	3	9.0
1993	1	2	1	2	3	2	3	4	2	2	3	2	7.9
1994	1	1	1	2	1	1	2	3	2	2	2	2	7.8
1995	1	1	1	1	1	1	1	1	1	2	2	1	7.5
1996	1	1	1	1	1	1	2	2	1	1	1	1	6.5
1997	1	1	1	1	2	2	2	2	3	2	2	2	7.6
1998	2	1	2	1	2	2	2	3	2	2	4	2	7.3
1999	2	2	3	2	3	2	4	2	3	4	4	3	6.8
2000	3	2	2	1	2	2	3	3	4	4	4	3	7.1
2001	3	2	2	2	2	2	3	4	4	4	5	3	6.4
2002	2	2	2	1	2	2	3	4	6	6	7	3	5.4
2003	6	3	3	3	3	4	7	7	8	10	10	6	5.0
2004	5	4	4	3	3	4	9	7	7	8	9	7	5.3
2005	5	2	2	4	7	7	6	7	7	8	8	7	5.5
2006	4	4	3	4	6	5	6	7	6	7	7	6	5.4
2007	5	4	3	4	4	4	6	6	5	6	6	5	5.8
2008	4	2	2	3	2	3	4	4	4	4	4	4	5.7
2009	2	1	2	1	2	1	2	2	2	2	2	2	3.7
2010	2	1	2	1	2	1	2	2	2	2	2	2	3.6
2011	2	1	1	1	1	1	1	2	2	2	2	1	3.4
Mean	6.4	5.2	5.9	5.3	5.9	5.9	7.0	8.0	7.9	8.1	9.3	6.9	

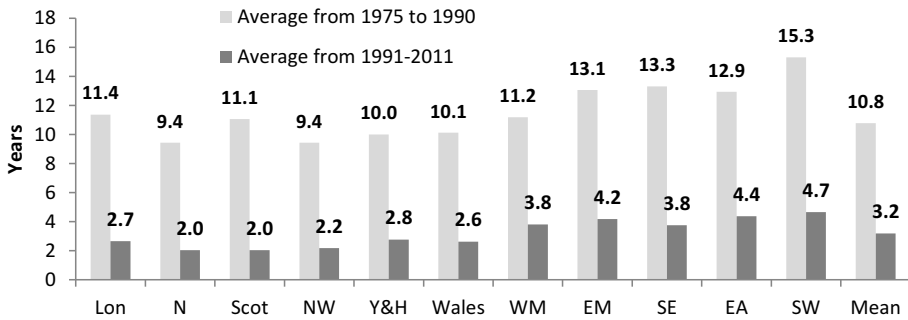


Figure 4. A comparison of the average years to breakeven without capital gain between regions over the periods, 1975 to 1990 and 1991 to 2011.

Upgrading Mobility Constraint

Research Method

The upgrading/buyer mobility constraint is evaluated by how long it took FTBs to accumulate enough equity and capital gains (net of transactions' costs) from existing properties in order to be able to upgrade. The simulation analysis depends on whether the net proceeds from the sale of existing property are big enough to upgrade or not. There are a number of ways this could be achieved, The analysis here is based on the following primary assumptions:

1. FTBs (that normally live in flats or terraced dwelling) move from existing properties to semi-detached properties (SDP). We obtained the regional house prices for SDP from ONS, covering only the period from 1983 to 2012. The analysis therefore only covers this period. An alternative approach based on statistics available for purchases by former owner occupiers was rejected as it would have included housing at prices at the top end of the spectrum and households not necessarily upgrading.

2. When existing FTBs upgrade, they obtain mortgage loans with the same terms and conditions of those available in the FTB mortgage market. This means that the down payments in this analysis will be determined based on semi-detached house prices and LTV ratios applicable in the FTB market. In this way households are assumed to maximize their mortgage capacity.

3. UK Finance (2017) indicates that the size of the average mover loan in the UK from 2004 to 2016 never exceeded the average FTB loan. This implies that movers use the entire proceeds from the sale of FTB houses (accumulated equity and capital gains) to voluntarily pay any amount in excess to what FTBs could borrow in a given year (based on FTB prices and LTV ratios in that year). We assume that UK Finance (Finance, Finance, and Banking 2017) findings are true and can apply for the period prior to 2004.

4. The net proceeds in a given year in this equation is based on the cumulative equity including capital gains but after deducting the selling fees of 1.5% of the sale price.

5. We assume that a FTB can move when the "net proceeds" from the sale of first house is equal to 80% of the "required capital" for upgrading. In other words, the movers will inject savings to upgrade, taken to be 20% of the required capital and the viability point would be achieved when the proceeds from the sale of FTB house is equal to or greater

than the required capital. This 20% figure can be viewed as probably the maximum capital that a household could inject. If a lower percentage is applied then this will mean that households will take longer to be able to afford to upgrade. The figures presented therefore below can be seen as minimum periods to upgrade.

The required capital constitutes the sum of the following:

- i) the down payment required for buying an average SDP based on LTV ratios in FTB market (DP (SDP)),
- ii) the purchasing fees (PF) as a percentage (1%) of SDP prices; and
- iii) in a given year and region, the difference in pounds between the LTV for SDP and the LTV for the average FTB. This is based on the assumption that the size of mover loans will not exceed the size of FTB loans.

This can be rewritten as follows:

Required capital = [SDP price x (1- LTV %)] + [SDP price x 0.01] + [(SDP price x LTV %) – (FTB price x LTV %)]

This analysis therefore applies a coverage ratio of 0.80 to determine the year at which FTBs will have enough housing capital to upgrade. By incorporating this coverage ratio the analysis presents an optimistic view of the time taken to upgrade compared with an assumption that a household was not in a position to save.

On this basis the analysis quantifies the number of holding years required for FTBs to upgrade and move to a semi-detached dwellings. The simulation analysis covers the time required to upgrade their home by FTBs in every year from 1983 to 2012, and covers the 11 regions of Britain. It can be seen as relating to the average such household and therefore a representation of the housing market. The next subsection presents the results.

Analysis of Upgrading Breakeven Periods

The times to upgrade reported in [Table 3](#) demonstrate a clear cyclical pattern and so the commentary below distinguishes the experiences of upgrading between historic stages in the housing market and between regions.

1983–1990 (boom)

The house price boom of the 1980s gathered pace in the mid-years of the decade before reaching a crescendo in 1988 with a national annual average increase of 10%. Its peak occurred in the second quarter of 1989. However, there were regional variations. House price inflation was much higher in southern regions centring on London, and in these regions the boom burnt itself out earlier in early 1989. In the peripheral regions where increases had not been substantial average house prices did not begin to rise significantly until the latter years of the decade or fall until 1990. Scotland did not experience a boom at all. The national boom came to an end with a combination of recession, high unemployment and the imposition of extremely high mortgage interest rates reaching 14.4% in 1989 (Jones and Watkins 2009).

The differential regional pattern of rising house prices is reflected in the time it takes to accumulate sufficient funds to be able to upgrade. In general the boom provided FTBs with significant capital gain that enabled the average household in most regions to upgrade within 2–3 years (all-regions median). However, London and Scotland have longer viability points than other regions. Due to the significant increase in house prices



Table 3. Years to upgrade by region from 1975 to 2011.

Year	NORTH EAST	NORTHWEST	Y&H	EAST MIDLANDS	WEST MIDLANDS	EAST	MIDLANDS	EAST	SEAS	ANGLO	LONDON	SOUTH	WESTWALES	Scotland	Median
1983	5	4	4	2	3	1	4	3	2	2	2	2	9	3	
1984	6	6	4	2	3	1	4	2	2	2	3	3	9	3	
1985	5	5	4	1	3	2	7	2	2	2	3	3	8	3	
1986	4	4	3	2	3	2	10	3	3	3	2	2	8	3	
1987	4	3	3	2	3	1	11	3	2	2	2	7	3	3	
1988	2	3	2	1	2	1	11	9	2	2	2	6	2	2	
1989	2	3	3	1	2	8	10	9	7	2	2	5	3	3	
1990	3	3	3	3	3	7	9	8	7	2	2	5	3	3	
1991	7	6	6	2	6	6	8	7	6	5	5	7	6	6	
1992	6	6	6	1	6	4	7	6	5	4	6	6	6	6	
1993	5	5	5	4	5	3	6	5	4	3	5	5	5	5	
1994	4	4	4	3	4	3	5	4	4	3	2	4	4	4	
1995	3	3	3	2	3	2	4	3	3	3	3	3	3	3	
1996	3	3	2	1	2	1	5	3	2	2	2	2	3	2	
1997	2	3	2	1	2	1	5	2	2	1	1	2	2	2	
1998	2	2	1	1	1	1	4	2	2	2	1	1	1	1	
1999	2	1	3	1	2	1	7	3	2	2	2	3	2	2	
2000	2	2	2	1	2	1	6	2	1	1	1	2	2	2	
2001	4	1	1	1	1	1	5	1	1	1	1	1	1	1	
2002	3	4	3	2	3	2	9	5	2	2	2	5	3	3	
2003	2	3	2	1	2	1	8	5	2	1	1	3	2	2	
2004	3	4	2	1	2	3	8	8	6	2	2	4	4	3	
2005	7	NP	5	6	6	5	NP	7	7	3	3	6	6	6	
2006	NP	NP	NP	6	NP	6	NP	NP	NP	NP	NP	6	NP	NP	
2007	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	
2008	NP	NP	NP	NP	NP	4	NP	NP	NP	NP	NP	NP	NP	NP	
2009	NP	NP	NP	2	NP	2	NP	NP	NP	NP	NP	NP	NP	NP	
2010	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	
2011	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	

NP: upgrading is not possible

in London in absolute terms and hence the increase in required deposits it took FTBs in London 4–11 years to reach the viability point. The growth rates in FTB house prices in Scotland were marginal over the 1980s, lower than the growth rates in other regions especially during the peak period from 1987 to 1989. With small capital gains in Scotland FTBs who bought during this period would take 5–9 years to reach the upgrading viability point.

1991–1995 (housing market downturn)

This period witnessed a housing downturn in which prices exhibited modest annual decreases that brought an average fall of 11% in nominal terms by the third quarter of 1995. By the fourth quarter of 1996 average prices had risen 8% from that bottom but were still 4% below the beginning of 1991. In fact average prices fell in all regions except Scotland that experienced a 10% nominal rise over the period. Mortgage interest rates, while lower than in the previous period, still averaged over 6% in each year (Jones and Watkins 2009)

The impact of stable to declining prices increased time periods to generate capital to upgrade. In fact many FTBs who bought at the peak of the 1980s boom would be in negative equity for some time. The regional median time periods required to upgrade for the average FTB in 1991–1993 is 5 or 6 years. It then falls as the market cycle turns and house price rises after 1995 work their way into the financial equation.

1996–2007 (long upswing)

This period experienced a combination of slowly falling mortgage interest rates (until 2003) and a long upswing in house prices that became a boom from 2002. As in previous housing market upturns southern regions led the rise in house prices with peripheral regions following. Nevertheless the rise in house prices in most significant in London and least in Scotland, with average house prices increasing by more than double in the former compared to the latter (Jones and Watkins 2009).

The long upward trend facilitated a quick building up housing equity. This made FTBs who purchased until 2003 in all regions – except London – able to upgrade within 1–3 years only. Due to the high absolute required deposits on one hand and high price difference between FTB and SDP markets in London, FTBs required 4–9 years to upgrade with an average (median) viability point of 6. FTBs at the end of this period are ultimately impacted by the bursting of the boom from the last quarter of 2007. This means that the subsequent fall in price ameliorates against building up capital, and some will have negative equity for some years. In contrast, FTBs in the West Midland purchased during the most of this period required just one holding year to be able to upgrade.

2008–2012 (post GFC)

The initial downturn in the housing market following the GFC was driven by the collapse of mortgage finance. The mortgage loan to value lending terms available rose creating a substantial shock to the housing market as the minimum required deposits for mortgagors were raised from zero to 25%. House prices fell in nominal terms over five quarters to the first quarter of 2009 by 21% across all regions of the UK. A subsequent muted and short-lived market recovery, helped by record low interest rates, imploded in late 2010, following the introduction of a programme of fiscal austerity by the government (Jones 2016).

Despite the unprecedented fall in interest rates the dramatic rise in the required deposit and falling house prices meant that the vast majority of FTBs who purchased

during this period were not financially able to upgrade by the end of 2012, except for a very few cases mainly in East Anglia.

Discussion and Conclusions

The owner-occupied housing market is often portrayed as a villain by placing barriers to household mobility which in turn are seen as impeding the working of the labour market, and hence creating economic inefficiency. However, very little empirical attention has actually been given to the mobility constraints of home ownership, identified in this paper as accessibility and upgrading. Both are central to the operation of the housing market and can be seen within a framework of housing careers with renting acting as a waiting room for a move to owner occupation.

In this respect entry constraints for tenants to home ownership have emphasized wealth and income affordability rather than mobility. The next stage in a housing career as set out above is the move to a better home in the owner-occupied sector. This trading up process has been linked to the family life cycle with little reference to mobility constraints. This is the first paper to focus on these mobility constraints from a pure financial perspective and places them in the context of changing housing market conditions and in particular the role of housing cycles.

The research simulates the behaviour of the average FTB in each region of Britain. First, it considers the accessibility constraint by finding the number of holding years it requires to make home ownership viable for FTBs in every year between 1975 and 2011. It then repeats the analysis removing the capital gain to demonstrate the importance of house price inflation on this constraint. Second, the study examines the years required to build up sufficient equity by an average FTB to upgrade to a semi-detached house. This latter analysis is based on the period 1984–2012. The research approach is unusual but by focusing on housing financial decisions of an average household it provides insights into the dynamics of the housing market.

The examination of years to breakeven for FTBs reveals that the accessibility mobility constraint is more psychological than real. For nine out of ten FTBs over our 37-year study period the breakeven is between 1 and 3 years. But there is a clear cyclical influence with FTBs that purchase near or at a price peak requiring a greater breakeven period than those who purchase during or shortly after a downturn. The length of time to breakeven is also dependent on interest rates and the scale and duration of the consequent downturn.

Given the significance of the housing market cycle in influencing breakeven points the analysis is repeated removing any capital gain/loss, so that households are solely dependent on equity accumulation through mortgage repayments and appreciation in imputed rents. The breakeven periods based only on mortgage repayments reveal very high values from 1975 to 1991 and much lower values from 1992 through 2011. Part of the explanation lies in the differences in interest rates over the two periods, but the role of cycles is still a contributory factor.

The analysis of the number of holding years required for FTBs to upgrade and move to a semi-detached dwellings demonstrates a further close relationship with housing cycles. In price upswings households find it relatively easy and quick to acquire funds to enable them to accumulate the necessary deposit to regear and upgrade to a better house. In doing so they fuel the rise in house prices. However, in the downturn prices fall back or are

at best exhibit very modest increases so that it takes a large number of years for a household to be in a position to upgrade (especially if original purchase is at or near the top of the boom). In summary upgrading is easier in an upturn as capital gains can be used to regear and move, whereas in a downturn there is no or little capital gains and the cost of moving all financially deter moving. The relative ease of moving is reflected in the pattern of transaction activity that closely mirrors the house price cycle (HMRC, Hmrc and Customs 2015).

This process could be further constrained by stricter loan to value ratio policies by banks in the downturn. Taking a broader view of this dampener effect on demand, it is likely to contribute itself to lower house prices and be a key component of the evident slow price recoveries from market downturns. This differential experience either side of a price peak explains the shape of housing market cycles with rapid boom followed by a long muted recovery.

A policy perspective on these results suggest, first, that a short expected stay in a location (longer than 2 years on average) should not be a constraint on buying a first house. The owner-occupied sector is therefore not financially constraining the labour mobility of young adults. In as much as young mobile adults are choosing to rent rather than buy it is because of the flexibility. Second, while government policies to kick start the housing market in a downturn have focussed on financially supporting FTBs the constraints on second-time buyers near the bottom of the housing market suggest this strategy is misplaced.

Conflicts Of Interest

No potential conflict of interest was reported by the author(s).

References

- Ball, M. 2006. *Buy to Let. The Revolution - 10 Years On. Assessment and Prospects*. Amersham: Association of Residential Letting Agents.
- Banks, J., and S. Tanner. 1999. *Household Saving in the UK*. London: Institute for Fiscal Studies.
- Böheim, R., and M. Taylor. 2002. "Tied Down Or Room To Move? Investigating The Relationships Between Housing Tenure, Employment Status And Residential Mobility In Britain." *Scottish Journal of Political Economy* 49 (4): 369–392. doi:10.1111/1467-9485.00237.
- Bone, J., and K. O'Reilly. 2010. "No Place Called Home: The Causes and Social Consequences of the UK Housing 'Bubble'." *British Journal of Sociology* 61 (2): 231–252. doi:10.1111/j.1468-4446.2010.01311.x.
- Chiuri, M. C., and T. Jappelli. 2003. "Financial Market Imperfections and Home Ownership: A Comparative Study." *European Economic Review* 47 (5): 857–875. doi:10.1016/S0014-2921(02)00273-8.
- Clapham, D., P. Mackie, S. Orford, I. Thomas, and K. Buckley. 2014. "The Housing Pathways of Young People in the UK, Environment and Planning." *Environment and Planning A*. 46 (8): 2016–2031.
- CML. (2010) "Consumer Opinion Survey Undertaken by YouGov for the Council of Mortgage Lenders Press Release, CML Survey Shows Long-term Desire for Home-ownership Stronger than Ever". <http://www.cml.org.uk/cml/media/press/2708>
- CML, Council of Mortgage Lenders (2011), "Stamp Duty Fact Sheet, CML", London. <http://webarchive.nationalarchives.gov.uk/±/http://www.communities.gov.uk/housing/rentingandletting/privaterenting/>[January 2014]

- DCLG, Department for Communities and Local Government. 2018. *Table FT1101 (S101): Trends in Tenure From: Department for Communities and Local Government, English Housing Survey*. London: DCLG.
- Finance, U. K., U. K. Finance, and Banking. 2017. *UK and Irish Housing Markets: A First-time Buyer Perspective, Co-authored by UK Finance and Banking & Payments Federation Ireland*. London: UK Finaance. [file:///C:/LocalStore/am1029/Downloads/uk-and-irish-housing-markets-research-report%20\(1\).pdf](file:///C:/LocalStore/am1029/Downloads/uk-and-irish-housing-markets-research-report%20(1).pdf)
- Goodman, A. C., Goodman. 2001. "Estimating Equilibrium Housing Demand for 'Stayers'". *Journal of Urban Economics* 51 (1): 1–24. DOI:10.1006/juec.2001.2234.
- HBOS, Halifax Bank of Scotland. 2012. *Halifax Economic Fact Book*. Halifax: HBOS.
- HMRC, H. M. R., and Customs. 2015. *Annual UK Property Transaction Statistics*. London: HMRC.
- Jones, C. 2012. "The UK Housing Market Cycle and the Role of Planning: The Policy Challenge following the Financial Crisis." In *Challenges of the Housing Economy: An International Perspective*, edited by C. Jones, M. White, and N. Dunse, 195–215. Chichester: Wiley-Blackwell.
- Jones, C. 2016. "The Credit Crunch: Short-term UK Housing Market Correction or Long-term Tipping Point?" *International Journal of Housing Policy* 16 (1): 70–90. doi:10.1080/14616718.2015.1067971.
- Jones, C., and C. Watkins. 2009. *Housing Markets and Planning Policy*. Blackwell: Oxford.
- Kemp, P. 2002. *Private Renting in Transition*. Coventry: Chartered Institute of Housing.
- Linneman, P., and S. Wachter. 1989. "The Impacts of Borrowing Constraints on Homeownership." *The American Real Estate and Urban Economics Association (AREUEA)* 17 (4): 389–402. doi:10.1111/1540-6229.00499.
- MHCLG, Ministry of Housing, Communities and Local Government (2019) "Private Rented Housing: Labour Mobility, Parliament UK, Written Question - HL15642", <https://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/lords/2019-05-09/HL15642/>
- Mostafa, A., and C. Jones. 2019. "The Financial Returns from Buying versus Renting: The Experience of First-time Buyers in Different Regions of Britain." *Journal of European Real Estate Research* 12 (1): 112–133. doi:10.1108/JERER-07-2018-0032.
- Ngai, R. L., and K. D. Sheedy. 2019. "The Decision to Move House and Aggregate Housing-Market Dynamics." *Journal of European Economics ASSOCIATION Economic Literature*. doi:10.1093/jeea/jvaa001.
- ONS, Office of National Statistics. 2009. *Regional Trends Online, Average Weekly Rent by Tenure*. London: ONS.
- ONS, Office of National Statistics. 2011. *Experimental Index of Private Housing Rental Prices - Index Levels*. London: ONS.
- Ortalo-Magne, É., . F., and S. Rady. 2002. "Tenure Choice and the Riskiness of Non-housing Consumption." *Journal of Housing Economics* 11 (3): 266–279. doi:10.1016/S1051-1377(02)00100-6.
- Ricketts, M. 1982. "A Model of the Furnished Rented Housing Market under Regulation." *Scottish Journal of Political Economy* 29 (1): 1–21. doi:10.1111/j.1467-9485.1982.tb00433.x.
- Rossi, P. H. 1955. *Why Families Move: A Study in the Social Psychology of Urban Residential Mobility*. Glencoe IL: Free Press.
- Saunders, P. 1990. *A Nation of Home Owners*. London: Unwin Hyman.
- Schulz, R., M. Wersing, and A. Werwatz (2009) "Renting versus Owning and the Role of Income Risk: The Case of Germany", SFB 649 Discussion paper, no. 2009-060, Humboldt-Universität zu Berlin, Berlin.
- Shelton, J. P. 1968. "The Cost of Renting versus Owning a Home." *Land Economics* 1 (1): 59–72. doi:10.2307/3159610.
- Sinai, T., and N. S. Souleles (2003), "Owner-occupied Housing as a Hedge against Rent Risk". Working Paper 9462, National Bureau of Economic Research, Cambridge, Massachusetts.
- Stephens, M., J. Perry, S. Wilcox, P. Williams, and G. Young. 2019. *UK Housing Review*. London: Chartered Institute of Housing.

Appendix 1 The Financial Model for the Accessibility Constraint

The model generates a cash flows template for each FTB case and calculates the gross financial return from buying (GR). In a given year of purchase, every simulation uses the actual historical regional values of key variables including house prices paid by FTBs (last purchase in 2011 and last sale in 2012), LTV ratios, variable mortgage and saving interest rates, private rental values, stamp duty tax rates and interest tax relief. The algebra of the model is now considered.

The gross return is measured by the wealth created per each £ invested in the initial outlay (paid by the buyer) using the DCF method. It measures the wealth multiple for each £ pound invested by dividing the sum of present values of all annual cash flows (the numerator) by the initial outlay (the denominator) as written below:

$$\text{GrossReturn} = \frac{\text{PVofannualCashFlow}}{\text{InitialOutlay}}$$

$$GR = \sum_{t=1}^N \frac{CF_t}{(1+r)^t} IO \quad (1)$$

The initial outlay (IO) consists of the down payment amount (DP), buying fees (f_0) (fixed at 1% of the purchase price) and stamp duty taxes (SD). Each of the above three components are determined as a percentage of the purchase price (HP_0) and can be written as follows:

$$IO = DP + f_0 + SD \quad (2)$$

$$IO = HP_0[(DP\% + f_0\% + SD\%)] \quad (3)$$

The annual cash flows CF_t is the difference between the annual cost of renting (R_t) and annual cost of owning (OC_t) as given below:

$$CF_t = R_t - OC_t \quad (4)$$

The cost of owning (OC_t) is the sum of annual mortgage payments ($MPAY_t$) and the repair and insurance costs (RIC_t) less any mortgage interest tax relief ($MITR_t$) if applicable. The MITR scheme had been introduced in 1975 and abolished in 2000 (HBOS, Halifax Bank of Scotland 2012), therefore its value for year 2000 and beyond will be zero. OC_t can be written as follows:

$$OC_t = MPAY_t + RIC_t - MITR_t \quad (5)$$

Substituting for OC_t in the Equation 1 CF_t can be rewritten as follows:

$$CF_t = R_t + MITR_t - MPAY_t - RIC_t \quad (6)$$

The analysis uses the rent yield to determine the cost of renting in the first holding year (R_1) and then allows the rent to grow over the following years at the compound annual growth rate in rent (RG). The first year's cost of renting (R_1) is determined using the rent yield (landlord's return) at year of purchase (RY_0) and the house purchase price (HP_0) as follows:

$$R_1 = HP_0 \times RY_0 \quad (8)$$

The rent review interval in the regions that witness the highest house prices and rental values, namely London, the SW, SE and EA regions is assumed to be 1 (i.e. the rents grow annually in line with RG the analysis period) while the rents in all other regions are presumed to grow every two years ($RRI = 2$). The annual cost of renting (Rt) is written as follows:

$$R_t = R_{t-1} \times (1 + RG)^{RRI} \quad (9)$$

The growth rate in rents over a given period (RG) is calculated as follows:

$$RG\% = \left[\left(\frac{R_N}{R_0} \right)^{1/N} - 1 \right] \quad (10)$$

Where R_0 and R_N are the rental values of the beginning and end of the breakeven period, respectively, while N is the number of years to breakeven.

The discount rate applied in the model reflected the risks associated with home ownership. It provides a set of both housing (control and security) and non-quantifiable financial benefits (as being inheritance and collateral) which can offset all risks associated with owning versus renting. On this basis the discount rate applied does not include any risk premium. The discount rate used by the paper is the weighted average interest rates on the bank saving accounts over the analysis period. This assumption is based on a report produced by the Institute for Fiscal Studies in 1999 noting that the majority of people save in conventional saving accounts such as the interest-bearing bank accounts and building society accounts (see Banks and Tanner (1999)).

The biggest challenge for the study was the establishment of a private rental data time series that is frequent and reliable and covers the selected eleven regions of Britain as far back as to 1975. The time series had to be creatively estimated from a number of sources and diverse approaches were necessary for different time periods. Over the period from 1995 to 2008 rents on assured tenancies and assured shorthold tenancies were collected directly from two reliable sources, Housing and Construction Statistics Book from 1995 to 1999 (HCSB); and ONS from 2000 to 2008 (Regional Trend Online) to represent private rental values (ONS, 2009). Regional private rents from 2009 to 2012 were derived using the Index of Private Housing Rental Prices (IPHRP) by ONS (ONS, Office of National Statistics 2011) covering the period from Jan 2005 onwards with a base year of January 2011 .

Prior to 1989 the private rented sector was subject to rent regulation whereby a landlord or a tenant could apply for a rent to be registered as a “fair rent” (below market level). Our period from 1975 to 1987 market rents were therefore highly influenced (dampened) by regulated rents that had been subject to fair rent assessment by Rent Officers (Ricketts 1982). So the study uses the private regulated rents data published by the Housing Statistics (regulated rents for furnished and re-registration tenancies) as a proxy to private rents during the said period. However, these regulated rent data are only available for three regions, namely “Greater London”, “Rest of England and Wales” and “Scotland” therefore estimating the rents for other regions required some interpolation. To undertake this task the relationship between local authority social housing rents and average market rents is assessed for a different period, 1995–2008, and these ratios were then applied to 1975–87 to provide estimates of the average rents for the missing regional data. Because of the lack of data on regulated rents in 1988, it is assumed that the rents in 1987 and 1988 are the same in all regions.

The period from 1989 to 1994 lacks any private rent data. The *only* available rent data over this period is local authority rents. To interpolate the private rents over this period the same approach as above for the missing data in 1975–87 is applied. In other words the relationship between private rents and local authority rents from 1995 to 2008 is assumed to apply to regional market rents from 1989 to 1994.

Overall there is not a complete set of regional rent data from 1975 to 2009 so the study has estimated the gaps in the series. This has involved some interpolation and in some cases heroic assumptions “but given the short breakeven periods this is of limited significance”. The rental data were then used to estimate regional rent yields over the period. These are calculated by dividing the annual rental values by annual lower quartile house price in each region to reflect the nature of the PRS with its bias towards cheaper housing stock.

Appendix 2. An example of the breakeven analysis using DCF approach for a FTB case who purchased in London in 1980 and reached the breakeven point in four holding years. However, it took this FTB 12 years to break if the capital gains were ignored

FTB Case

Holding/ Analysis Period -Years
 FTB House Purchase Price (HP0)
 LTV ratio
 Down Payment
 Mortgage Loan
 Mortgage interest rate for the first year
 House Sale Price (HPN)
 Stamp Duty £
 Transaction Costs - Buying 1%
 Transaction Costs - Selling 1.5%

4
£24,925
67.2%
£8,183
£16,742
14.9%
£32,635
£125
£249
£490

Cash Flows

Year	Year	DP, SD, Sale proceeds	Loan Final repayment	Maintenance & insurance Costs	Rents	Mortgage Payments	Mortgage Tax relief	Buying, Selling Costs	Cash Flows Incl. C G	Cash Flows Excl. C G
0	1980	-8,308						-249	-8,557	-8,557
1	1981	0	0	-204	1,475	-2,561	748	0	-542	-542
2	1982	0	0	-222	1,597	-2,422	699	0	-348	-348
3	1983	0	0	-232	1,728	-2,316	660	0	-160	-160
4	1984	32,635	-16,278	-244	1,871	-1,994	542	-490	16,042	8,448

DCF

Average cost of capital	10.92%
Initial Outlay (IO)	£8,557
Present value of <u>cash flows</u> including capital gains	£9,711
Present value of cash flows excluding capital gains	£4,693
Present value of <u>capital gains</u>	£5,018

Return

Gross Return (GR) = PV CF including CG / initial outlay	1.1
GR per a holding year (GR-PHY) = GR / holding period	0.28
Return excl CG = PV CF excluding CG / initial outlay	0.5
PV of CG / IO	0.6
PV of CG / PV of GR ratio	52%

Breakeven without capital gains:

Cash Flows

Year	DP, SD, Sale proceeds	Loan Final repayment	Maintenance & insurance Costs	Rents	Mortgage Payments	Mortgage Tax relief	Buying, Selling Costs	Cash Flows Incl. C G	Cash Flows Excl. C G
1980	-8,308						-249	-8,557	-8,557
1981	0	0	-204	1,475	-2,561	748	0	-542	-542
1982	0	0	-222	1,681	-2,422	699	0	-264	-264
1983	0	0	-232	1,915	-2,316	660	0	27	27
1984	0	0	-244	2,183	-1,994	542	0	487	487
1985	0	0	-247	2,488	-2,153	592	0	680	680
1986	0	0	-251	2,835	-2,265	604	0	923	923
1987	0	0	-263	3,230	-2,173	526	0	1,321	1,321
1988	0	0	-278	3,681	-1,925	402	0	1,881	1,881
1989	0	0	-297	4,195	-2,218	486	0	2,167	2,167
1990	0	0	-316	4,781	-2,425	541	0	2,580	2,580
1991	0	0	-331	5,448	-2,413	527	0	3,231	3,231
1992	65,035	-14,093	-343	6,208	-2,082	408	-976	54,158	14,650

DCF

Average cost of capital	10.45%
Initial Outlay (IO)	£8,557
Present value of <u>cash flows</u> including capital gains	£21,416
Present value of cash flows excluding capital gains	£9,435
Present value of <u>capital gains</u>	£11,981

Return

Gross Return (GR) = PV CF including CG / initial outlay	2.5
GR per a holding year (GR-PHY) = GR / holding period	0.21
Return excl CG = PV CF excluding CG / initial outlay	1.1
PV of CG / IO	1.4
PV of CG / PV of GR ratio	56%