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A Consideration of Related Contributions in the Fields of Housing and Consumption

Abstract In this chapter, there is a review of literature in various fields of the ripple effect. As a key theme is the role of cycles and co-movement of economic indicators across space, additional literature is drawn from discussions of regional economic integration across Europe. The notion being that methods used at that level could be applied to the regional. Different models of interaction are considered in Chap. 3, in particular, Limtanakool et al.'s overarching framework of nodal interdependence. One can place balanced and imbalanced models within this. As such, monocentric and polycentric urban perspectives can be captured.

Keywords Ripple effect · House prices · Quality of housing · Housing market

2.1 Introduction

In this chapter, there is a review of literature in various fields of the ripple effect. As a key theme is the role of cycles and co-movement of economic indicators across space, additional literature is drawn from

discussions of regional economic integration across Europe. The notion being that methods used at that level could be applied to the regional. There is also a review of the impact of housing on consumption activity.

2.2 House Price Diffusion Between Buyers, Vintages, and Regions

Three strands of the housing market interaction literature are considered here. There are contributions focused on the buyer, their age, and housing career, such as Ortalo-Magné and Rady (2006), Morrow-Jones and Wenning (2005), and Sommervoll et al. (2010). Second, there are contributions based on the property, such as Coulson and McMillen (2007) and Ho et al. (2008) on differing housing qualities; costliness (Smith and Ho 1996; Smith and Tesarek 1991); and vintage (Cook and Holly 2000; Gray 2015). The third strand features price dispersion across space, often described as the ripple effect (*inter alia*, Alexander and Barrow 1994; Meen 1999; Shi et al. 2009; Wood 2003). The most popular area of research in this strand, the ripple effect in the UK, has it that average regional house price increases are led by London and the South East, spreading to the rest of the country.

2.2.1 UK House Price Ripple Effect

Evidence for the so-called ripple effect in housing comes from Giussani and Hadjimatheou (1991) where it is suggested that house prices in Greater London and the South East increase before those in other regions. Indeed, defining the south as Greater London, South West, South East, and East Anglia, they show the North–South Divide in house prices. They use cross-correlations of annualised quarterly, non-pre-whitened house price changes to reveal lags between movements in Greater London house prices and others. The southern regions of South East and East Anglia are in line, the South West, North West, and East Midlands involve a lag of one period, and the North, Yorkshire/Humberside, West Midlands, and Scotland have a lag of two. Following

on, they use bivariate Granger causality tests to consider causation between the regions and Greater London. South East, South West, and East Anglia exhibited instant causality with Greater London. Otherwise, there is Granger causality from Greater London to all other British regions. As cross-correlations can offer misleading results due to significant serial autocorrelation in either series, pre-whitening is a necessary step, which has not been undertaken.

Hamnett (1988) investigates the relationships between British regional housing markets over the period 1969–1987. Hamnett's description of the pattern of annual UK house price movements suggests that regional growth rates were about the same from 1970 to 1981 and, with the exclusion of Northern Ireland, the house price rankings were stable. It is after this period that the most expensive house price regions, the South East, East Anglia, and the South West, grew more rapidly than the rest. Hamnett goes on to suggest that for the three cycles in his data period, the South East moved into the growth stage and decline stage before the rest, as if the region was out of phase and leading the regional housing system. It appeared then that the south was delinking from the north. It is interesting that house prices in the 1990s in the southern regions had fallen more rapidly than in the north, restoring regional–national house price ratio that Meen (1999) asserts should not exhibit much, if any, of a long-term trend. However, JRF (1995) shows an instability in a North–South East ratio from the 1960s onwards. Thus, the finding of house price convergence, or lack of it, may be period-dependent.

There are numerous cases of papers quoting stable long-run regional relationships. Using UK house price data, Alexander and Barrow (1994) analyse the short-run relationships between pairs of regions using Granger causality tests or, where pairwise cointegration is found, error-correction models. Utilising the 0.1% level of significance, the pairwise Granger causality tests reveal 24 links. Worthington and Higgs (2003) using a different causality method, similar data and period of study, reveal a very small number of regional links in the short run.

Using data from 1969–1995, Munro and Tu (1996) divide the country up into five super-regions: the south, the north, Wales, Northern Ireland, and Scotland. They find that four of the possible ten combinations are

cointegrated on a pairwise basis. Notably, Northern Ireland is not cointegrated with any other area; Wales is not cointegrated with other parts of England; and Scotland is cointegrated with the south only. They also undertake a Granger causality analysis of the housing system, finding that the south Granger causes the north and Wales. No other cases are significant, supporting the notion that the south leads the north. However, given that Scotland (and Northern Ireland) is not involved in either long- or short-run relations, they are separate regions, a point the authors do not explore, but is analysed in Ashworth and Parker (1997).

Holly et al. (2011) apply a spatio-temporal impulse response technique to regional house real price diffusion. They find that London leads the UK with temporal and spatial delays (specifically, a ripple) but also New York prices are found to be weakly exogenous, through London.

The Baumolian approach to convergence, applied initially to countries, starts from a distinction between rich and poor, developed and less developed. The less developed or poor has a low GDP/head, but due to the forces of convergence and the assumption of a common production function, it catches up to the rich level of income at a relatively rapid rate.

Utilising a Baumolian expression, where there are time series and cross-sectional elements, Drake (1995) examines regional house price convergence. Using quarterly data of the logarithm of an UK index of house prices from 1969 to 1993 as the national and the logarithm of South East house prices as the leading region, Drake fails to find a ripple effect from the South East. But he does find evidence of a 'norm differential' between the house prices of the southern and Midlands regions and the South East *outside the Capital*. He highlights the North, East Anglia, and Scotland as the particular regions exhibiting divergent characteristics. Note Drake did not utilise the capital as the leading markets.

A series of articles (Cook 2003, 2005, 2012) considers the dispersion of house prices across the UK. Widespread prevalence of the finding of cointegration is to be expected as the divergence of regional house prices in the 1980s was replaced by convergence in the 1990s. A question for Cook is symmetry across the long-run relationships. Allowing for asymmetry reveals more dimensions in the long-run relationships between house prices in the different regions of the UK. The ripple effect, which implies convergence, is also asymmetric. In Cook (2005), the ripple

in the South East occurs first, dispersing gradually to other regions. A decrease in that leading region has a more immediate impact. Cook (2003) finds that Outer South East, East Anglia, and South West experience faster convergence during downswings but other regions, such as the North, North West, West Midlands, and Scotland, exhibit faster rates in upswings. Examining co-movements between London and the other regions, Cook and Watson (2015) reveal a strong correspondence with distance and that London exhibits differing behaviour to other regions during downturns.

Using Pesaran's (2007) pairwise approach to convergence, Abbott and De Vita (2013) find that there is little evidence for convergence among regional house prices. Montagnoli and Nagayasu (2015) find convergence clubs in UK housing of: the South East outer ring plus Northern Ireland; a second is of the Midlands; and the third is of four northern regions. London is distinctive in not converging. This is a trend not a cycle issue but is worth keeping in mind when considering the implications of a ripple effect.

Using the case study of Glasgow again but with repeat sales data, Jones et al. (2003), and then later in the Strathclyde area, and Jones and Leishman (2006) find that, using cointegrated data, sub-markets are stable over time (14 years). They seek to reveal the influence of the leading housing market, Glasgow, in a long-run context within two sub-regional housing market groupings by analysing, in a consideration of cointegration among a group of housing markets areas, whether the addition of the leading region results in an increase in the number of cointegrating vectors. The group ought to be cointegrated, and the addition of the leading region should increase the number of cointegrating relations by [at least] one. They find that the addition of Glasgow adds to the housing system model for the Ayr area but not for the Paisley market.

2.2.2 Contributions Using Other Methods

Using spatial autocorrelation, Gray's (2012) shows a clear ripple effect in the South East/South West/East of England—an area typified as monocentric (De Goei et al. 2010). Holmes (2007), Holmes

and Grimes (2008) use region–nation differentials to establish convergence. The latter's focus is principal components analysis and the use of panel unit root tests. They find there is widespread convergence, but Tsai (2014, 2015) does not. Carvalho and Harvey (2005) argue that a unified market exists in this approach when all regions are converging to the national average. If one is diverging, this will affect the reference national average.

McGough and Tsolacos (1995) take the UK commercial property series, detrend them using the Hodrick-Prescott (H-P) filter, and then apply cross-correlations to expose delays. Jin and Grissom (2008) apply the H-P filter to separate trend from the cyclical component in house prices. Using an ARMA model combined with the extracted trend, they forecast house prices in US cities.

2.2.3 Revealing House Price Diffusion in Other Countries

Stevenson (2004) utilises second-hand house prices for the Irish urban areas of Dublin, Cork, Galway, Limerick, Waterford plus the residual, rural. He provides a detailed description of the Irish housing market. His method entails city pairwise and multi-variate error correction models (ECM). He finds three out of a potential five common trends, suggesting the Irish city housing market areas are reasonably closely bonded together in the long run (Dickey et al. 1991).

When considering Granger causality tests on a multi-variate basis, Stevenson finds that Dublin is not a clear leader of all others. Rather, it causes a change in the 'Rural' that Granger-causes change in the others. Citing Alexander and Barrow (1994), Stevenson believes that the rural market acts as an extension of Dublin's 'reach'. Dublin is the only time series that Granger-causes all others on a bivariate basis and is not Granger-caused itself, and so appears as the leading region.

Berg (2002) finds that there is a leading city in the Swedish system; that of Stockholm, over a range of periodicities from a month to a year. However, with the exception of 'Sparsely Populated', Stockholm is found to be Granger-caused by each one of the other residential

variables used, leaving the lingering question about Granger causality and leadership: Which leads which market?

Luo et al. (2007) find that, using a pairwise error correction approach, there is a hierarchy in the diffusion pattern of house prices among Australian state capital cities, with Sydney at the top level, followed by Melbourne, then Perth and Adelaide, and finally, another four cities. Diffusion is not necessarily related to size/urban hierarchy or an inverse function of distance. For example, Brisbane is the third city by population and is relatively close to Sydney but is placed at the bottom of their city hierarchy. They find more causal links between non-contiguous regions than contiguous ones, and that prices are, in part, driven by local economic growth. Luo et al. conclude that it is not the largest market that drives all others; no housing market is subject to a distinctive trend; and the markets are bonded in the long run, to what extent is not clear. Wilson and Zurbruegg (2008), Tu (2000) find a segmented Australian housing market space, where prices are driven by internal factors, such as earnings. On a pairwise basis, Tu (2000) finds few cases of Granger causality among Australian capitals but there is a 'ripple' from Brisbane, through Sydney to Melbourne.

Authors using US house price data find house price diffusion among neighbouring but not non-neighbouring tracts (Pollakowski and Ray 1997; Dolde and Tirtiroglu 1997). This is suggestive of the information from other territories feeding into local prices. However, there is no national ripple effect. Perhaps that is a function of the size of the USA and the large tracts of empty space between urban areas.

Lee and Chien (2011) find that Taiwan's regional house prices exhibit a long-run relationship except with Taipei City. The authors use three cities and Taipei City's hinterland, Taipei County, whose average house prices are above the other cities in the study. There is long-run but not short-run causality from the other cities to Taipei City, which is a result inconsistent with an integrated national housing market system. Taipei County feeds back with Taipei City and Granger-causes Taichung City, a local housing market area. Interestingly, when applying different techniques to the same data, Chen et al. (2011) find that Taipei City is found not to be cointegrated with the rest of the housing market system, suggesting a segmented market again.

Using Finnish data, Oikarinen (2006) finds that housing price changes diffuse first from the country's main economic centre, the Helsinki Metropolitan Area, to regional centres, and then to the peripheral areas. This is consistent with an urban system thesis. His explanation for this, though, relates to information asymmetries between professional market agents concentrated in the metropolitan areas and others in the periphery.

2.2.4 Price Interaction Between Housing Markets of Different Quality

Coulson and McMillen (2007) posit that there is a house price ripple effect related to the quality of housing. The most expensive house prices, assessed by quantile, lead the next quantile down, and that leads the one below it, and so on in a Granger causality sense. They also test for cointegration with a view to expose a long-run equilibrium between five different qualities of housing. Positing that there are only one or two common shocks driving house prices, they anticipate that the number of cointegrating vectors will be three or four. Using house price indices for three municipalities near Chicago, USA, they find that the prices of lower quality houses are Granger-caused by higher quality ones but not the reverse. They also find that the five indices for each of the three areas are cointegrated.

Hui (2011) explores segments of housing markets in Malaysia. Using a Baxter-King and a Christiano and Fitzgerald filter, he decomposes deflated dwelling price indices into trend and cyclical components. He establishes temporal delays between sub-markets of condominiums, terraced, semi-detached, and detached residential accommodation. Cross-correlations of the cyclical components indicate that non-landed dwelling prices lead landed ones. In-sample Granger causality tests and Theil's U for out-of-sample forecasting suggest the modelling of the landed dwelling prices is improved when condominiums' values are included in terraced and semi-detached models. He argues that this form of real estate is more likely to be seen as an investment than the others. With a lead of one to two quarters, investors can make profit from terraced and semi-detached properties.

At odds with Hui and Coulson and McMillen, Ho et al. (2008) find the reverse. Granger causality tests indicate that lower quality housing in Hong Kong drives higher quality ones. There is no feedback.

DiPasquale and Wheaton do not imply a direction of price change between quality tiers, only an equilibrating system that drives long-run prices to have a stable differential. Levin and Pryce (2009) find that inequalities between high- and low-cost housing market areas are cyclical.

There are a number of contributions to the quality hierarchy related to types of buyers. Borgersen (2014a, b) adds to the OMR framework a mix in between the flat and the house an intermediate [terraced] dwelling: thus, there are two trade-up homes, rather than one. Price amplification emerges through its dispersion between the steps of the housing ladder. A positive [income] shock to a flat affects the other two correspondingly. However, because an owner vacates a property when they move up, a shock to intermediate homes has a positive effect on houses but a negative impact on flats. A shock to houses affects the other two negatively. In other words, there is an asymmetry in the shock response. It has a positive effect upward, and a negative one downward. As the equity in the top segment has no outlet, which is consistent with Eichholtz and Lindenthal (2014), the house does not have an amplifier effect.

OMR presumes that a FTB purchase takes place when the flat can be afforded. There is no stock of vacant houses, so this purchase affects the house market. OMR proposes that a rise in income affecting the flat market may lead to an overreaction in the house market. Steady state flat prices are proportional to the endowments (income) of FTBs, whereas steady state house prices rise less than proportionally with endowments but more in absolute terms than flat prices. The differential expands. Benito (2006) notes that price instability in the OMR model can arise through volatility in income, particularly the marginal FTBs. Their participation will also be sensitive to changes in credit rationing.

The financial accelerator would favour those with assets (Aoki et al. 2004), which implies that RB dwellings would accelerate more rapidly than FTBs' (Borgersen 2014a, b; Meen 2011; OMR; Smith and Ho 1996; Smith and Tesarek 1991; Stein 1995), expanding the differentials between the tiers as price rises.

With Sommervoll et al. (2010), it is lack of buyer-interest that leads to selling price being revised, which could be foreseen by the vendor, suggesting this price signalling proposition is not inconsistent with their model. Indeed, as cycles in Sommervoll et al. are a function of adaptive price expectations, how price expectations are updated is crucial for cycle periodicities. If expectations are slow to adjust and feature local information overspill, then the cycles of one market could affect another's, possibly with a delay.

Pryce and Sprigings (2009) make the point that, as far as the life cycle/housing career is concerned, a father or mother buying a dwelling at the age of 25, having a child at 30, dying at 80, leaves that child with the possibility of inheriting the parental dwelling at 55, just about the same time that their mortgage is paid off. Fifty-five would be a life cycle's peak earnings period, so an intergeneration transfer of wealth to a FTB is far from improbable.

Borgersen (2014c) focuses on price volatility (risk) and intergenerational equity transfers. Here, a shock to house market affects flat prices through bequests, gifts, or housing equity release transfers, accelerating their rate of appreciation to be above that of houses. If intergenerational transfers and a trading down to a bungalow are included in the mix, there are outlets for the equity from the top segment in Borgersen (2014a). Indeed, trading down in price does not necessarily mean a smaller dwelling. Consistent with the second ripple strand, geographical migration could release equity whilst preserving the ownership of a four-bedroomed family home, spreading wealth to lower priced regions. Importantly, there is a feedback loop: a positive shock to flats, terraced, and houses will be amplified and affects all other parts of the property market. With the assistance of parents, the FTB can continue to join the housing ladder when normally out-priced, so that equity growth can be self-refreshing. This feedback can be possible within OMR's model. It is conceivable that a housing hierarchy/ladder can be maintained without many FTBs. When trading down, a housing series or chain could entail a RB selling a house and purchasing a flat, which funds someone else's terraced house procurement, which facilitates the acquisition of the house by a third party.

Using US data, Luea (2008) finds that gifts enhance households' property demand by 9–11% so that the acquisition entails a more expensive property with a greater housing cost burden. Mayer and Engelhardt (1996) and Engelhardt and Mayer (1994) find that a quarter of FTBs receive some familial financial support, supplying, on average, half of the deposit. Clarke (2011a) suggests that intergenerational transfers make up a significant but stable volume of mortgages. There were an estimated 31,000 UK FTBs that were 'assisted' in the second quarters of both 2005 and 2011, and yet the number of unassisted FTBs dropped by 78% to 16,000 over the same six years. So, whilst the number of 'assisted' FTBs remained stable, the 'assisted' proportion rose from 31 to 66%. More recently, Clarke (2015) estimated the proportion of unassisted FTBs stood at 38% in 2014, which is around the rate post-2008 in Clarke (2011a). The added complication was two Help-to-Buy programmes providing additional support. Notably, consistent with Luea (2008), the assisted FTB in 2014 bought a more expensive abode (£175,000) with a smaller loan (£120,000) than the unassisted (£147,000; £129,000).

An additional innovation during financial liberalisation in the fourth phase of Meen (2011) is the buy-to-let (BTL) mortgage. Pryce and Sprigings (2009) find that, as BTL purchasers occupy the same portion of the housing market as FTBs, purchasing a dwelling for rent sucks flats out of the owner-occupation market, possibly being rented to those that would have bought. The BTL mortgage began life in 1995 but since 1999, 90% have been taken out during periods of above-trend price increases (Pryce and Sprigings 2009). Clarke (2011b) disputes the claim about FTB displacement, making the point that these purchases are highly localised, in cities, possibly serving a student market. Also, the greater renting sector caters for the notable recent rise in the population of migrants in the UK.

Gregoriou et al. (2014) find that lending is decoupling from earnings and the duration of a repayment mortgage is drifting from 25 to 35 years (Giles 2016), with a quarter of first-time buyers taking out a 35-year mortgage in 2015 facilitating this. The Bank of England has imposed some limits on lending ratios but not on repayment periods.

It is worried by the implications of repayment period extending into retirement. This oversight allows for FTBs to afford the unobtainable dwelling, consistent with a Leamer-Minky-type criticism of financial regulation facilitating boosted house prices.

Cook and Holly (2000) consider whether there are common trends and cycles among *Older*, *Modern*, and *New* UK house prices. *New* housing is not cointegrated with second-hand housing on a pairwise basis. Non-synchronised, common cycles are found among the three series. This is interpreted as differential reactions to a common shock. They do not consider a ripple effect in these cycles. They find that *New* housing is more volatile, showing a tendency to rise more rapidly and to higher peaks relative to troughs. They explain this as the ability of owners of second-hand dwellings to hold on to their properties in a downturn. This runs counter to one of the premises in the work presented here: *New* should be less volatile than second-hand because of this. Using Spectral Analysis over 60 years, Gray (2015) finds a minor five and a major 7½-year cycle. He proposes that the pricing could be seen as supply-led (five-year cycle) or demand-driven (7½-year cycle). Or that the five year is more strongly linked to the FTB and the RB second-hand cycle lasts 7½ years. Contrary to Cook and Holly, *New* is found to have lower volatility, and *New* leads *Modern* which precedes *Older* dwellings.

2.3 How Long Are Economic Cycles?

De Groot and Franses (2012) and Jadevicius and Huston (2014) review papers that estimate cycles in socio-economic indicators. The latter pair catalogue major and auxiliary business cycles, whereas the former pair focus on contributions in the longer cycle range.

De Groot and Franses (2008) argue that long-term economic stability comes from the persistence of multiple, robust cycles that enables the 'system' to absorb exogenous shocks that would otherwise put mature economies 'off balance'. Revealing cycles of 10.3, 25.7, 57.7, and 92 years across four economies, the 10.3-year cycle is the most common with a probability that an economic variable would have such a cycle of over 0.5. They illustrate how an economic series could

be described by [a pair of] independent cycles. If they were harmonics of each other, there would be a notable long cycle reflecting the lowest frequency. Higher harmonics would be subject to interference, so be obscured. Where the [two] cycles are not harmonics, this interference would be much reduced. Overall, they conclude that an economic cycle could be represented by a few frequencies. Sanidas (2014) reveals four harmonic series in the fluctuations of the Australian Dollar. It, along with the New Zealand and Canadian Dollars, and the Norwegian Krone, is deemed a commodity currency, which is strongly affected by world price of their key export(s).

Agénor et al. (2000) find output fluctuations across developed and industrial countries have many similarities. Marchand (1981) reveals local cycles, which he defines as a set of impulses originating from industrial requirements of certain urban economies, whose rapid but limited impact is transmitted through import–export ties.

Calderon and Fuentes (2014) find that business cycles have changed over the 22 years to 2007. Studying 71 countries from 1970 of which 23 are developed, they find that recessions are steeper and costlier in developing economies and in the globalised/financial liberalised era (the great moderation 1985–2007), they are less so for both groups. Also, financial cycles precede real cycles. They use the Harding-Pagan approach to turning points in time series. Investment and consumption resemble real GDP dynamics but the former more, and the latter less, volatile. Across the 23, GDP has a cycle of around 28 and the UK around 30 quarters or $7\frac{1}{2}$ years.

Wunder (2012) suggests a change in business cycle drivers. Rather than investment which has been the norm since 1950, he avers that the last two cycles were driven by consumer activity. This consumer activity is funded by debt held by the top 20% of the income distribution. Thus, in the liberal era, consumption drives income.

Financial cycles are also of importance, not least as these are heavily associated with crises. Schularick and Taylor (2012) and Aikman et al. (2014) examine longer series using loans as a measure of credit. This is outstanding lending to corporates and households, both secured and unsecured. The former conclude credit aggregates contain valuable information about the likelihood of future financial crises. The

economist's view that money is merely a veil should be called into question. Aikman et al. find a $13\frac{1}{3}$ -year periodicity in credit within a 130-year series of UK data. This periodicity in credit is consistent with the eras of Meen (2011) and Scanlon and Whitehead (2011). In the longer run, the longer cycles in house prices and credit, which appear as trends when analysed over a few decades, could have 'common trends'.

Aikman et al. suggest that UK real loans or credit provision is procyclical, with an amplitude twice that of the general business cycle, as proxied by real GDP, but a periodicity, which is twice as long as the one for GDP. Moreover, they find a minor cycle of $4\frac{1}{2}$ years in duration. Variations in GDP do not account much for perturbations in credit (Aikman et al. 2014). Goodhart and Hoffman (2008) find that neither broad money nor credit in the 1985–2006 era affects output or house price inflation. Income and house prices are mutually reinforcing; the former does not Granger-cause money supply, but the latter do.

Drehmann et al. (2012) consider the cyclical characteristics of credit, credit/GDP, house prices, equity prices, and GDP, across seven OECD countries including the UK. They find that cycles of between 8 and 30 years are more important than those of shorter periodicities in characterising the variables' behaviour. In keeping with other authors, the cycles are possibly twice as long post-1985 compared with before. Creating a composite of property prices and credit, a financial cycle of sixteen years is found to correspond well with financial crises, not far from the 13 of Aikman et al..

Iacoviello and Pavan (2013) compare the US housing market during the great moderation and the great recession. They find that when credit constraints are relaxed, aggregate volatility is reduced but idiosyncratic volatility rises. Lower down payments should smooth housing demand but higher risk should deter buyers from purchasing larger dwellings. Using a H-P filter, they reveal that real GDP, consumption, housing investment (construction) and debt all exhibit a fall in the degree of cyclical in the period 1983–2010 compared with 1952–1982. The divide reflects differing eras of financial constraints and borrowing. Consistent with the permanent income hypothesis, consumption is far less volatile than income. Housing investment (construction) has $2.5\times$ the volatility of income in both eras. Debt does not alter much.

They find that household mortgage debt is highly pro-cyclical in the 30 years from 1952 with a correlation of 0.78. This drops to 0.43 in the 28 years after 1982, suggesting that an income criteria or constraint is loosened. If, as they claim, this is driven in part by impatient, constrained buyers moving when times are good, this puts housing in the same category as durable goods in general. Housing investment is also highly pro-cyclical with a correlation of 0.89 in the first period, dropping to 0.75 in the second.

2.3.1 Evidence of Cycles in Property

Property is an asset class where periods of under and over supply are the norm (DiPasquale and Wheaton 1996; Pyhrr et al. 1999). Using univariate spectral analysis, common cycles among stock indices of the property sector in Singapore, Hong Kong, Malaysia, Japan, and the UK of about 2½–4 years are exposed by Liow (2007). Chen et al. (2004) reveal two or three hidden periodicities in house price series from Hong Kong, Singapore, Taipei, and Tokyo from 1976 to 1998. They find a business cycle (of around 7.9–10.4 years), an intermediate cycle (3.2–4.4 years), and an annual cycle. They describe the business cycle as driven by exogenous shocks and the four-year periodicity as an endogenous production lag cycle. Alexander and Barrow (1994) and Rosenthal (1986) find a five to ten and six to eight year periodicity, respectively, in UK regional house prices. Wilson and Okunev (1999) reveal high cospectra values between real estate investment trusts and financial assets markets at cycles of 3 years in Australia, 3½ in the USA, and 6 and 8 years in UK series.

The Royal Institute of Chartered Surveyors finds cycles in UK property of around 8 years, with possibly two periodicities of five and nine years (Royal Institute of Chartered Surveyors (RICS) 1999). Indeed, Reed and Wu (2010) state that property cycles are ‘unavoidable’. Pugh and Dehesh (2001) point out that property cycles can be separated into endogenous and exogenous: the former because of long lead times in construction; the latter concerns the strong link between property and the wider macro-economy. Pritchett (1984) posits that, despite a common national house price cycle, there are separate, non-coincident ones of distinct types of property. The supply of property lags demand,

with cycle turning points occurring when the growth of the two are in opposite directions.

DiPasquale and Wheaton (1996) present a model of house prices incorporating simple price expectations that predicts cyclical behaviour without periodic exogenous variables driving them. Leamer (2007, 2015) argues that business cycles are housing cycles.

Filtering is common. Stevenson et al. (2014) and Akimov et al. (2015) employ a mean corrected index of concordance to assess the degree of commonality in property cycles. In the 2015 paper, they also decompose series into unobserved trend and cycle using a Hodrick-Prescott and a Beveridge-Nelson filter, correlating the detrended series. Agnello and Schuknecht (2011) use a 10,000 H-P smoothing parameter to reveal an upward and a downward UK house price trend of seven years each, consistent with Bracke conclusions about long cycles. Cyclical deviations from trend are used to 'define' housing bubble events. Bracke identifies 1989Q2 and 2007Q4 as peaks and 1996Q2 as a trough in UK house prices. Agnello and Schuknecht (2011) suggest the growth phase of 1983–1989 and 1997–2004, with a decline phase of 1990–1996. There are two sets of turning points: long and short term. The long-term undulations can be identified as 1983–1989, 1989–1996, 1996–2005, and 2005+.

Using spectral analysis, Barras and Ferguson (1985) find a major and a minor cycle for almost all the UK property construction series they examine. For example, there is a 6½-year major cycle and a 15-quarter minor cycle in private housing construction and a nine-year periodicity in private commercial property construction commissioning.

Rosenthal (1986) uses cross-spectral analysis to examine UK regional house price cycles in the period 1975–1981. He finds that at lower frequencies coherence was high with insignificant phase between regions and the nation. He also concludes that there is not much evidence that neighbouring regions are more closely related than non-neighbours.

Leamer (2007) argues that there is a US house sale volume rather than a price cycle that matters. This applies to both existing and new housing. Leamer (2015) shows existing house prices peaked in April 2007, 19 months after volume had begun to decline. Volume also picked up in January 2008, 15 months before prices. However, volume has not the long-run trend seen in prices.

Although adaptive expectations modelling can be viewed as not in keeping with *homo economicus*, DiPasquale and Wheaton (1996) cite evidence for this form of price forecasting by economic agents, and it does generate house price cycles, overshooting and bursting bubbles. In a review of three major asset price bubbles, Spotton (1997) draws a number of conclusion, amongst which include the formation of expectations of future capital gains was based on past price increases, not future income streams. Bubbles were fuelled by the availability of credit, probably borrowed against the assets whose prices were subject to speculation. Clayton (1998) also finds evidence supporting this notion of naïve forecasts in US real-estate markets. McDonald (1985) concludes that the expectation of nominal price increase has a significant impact on the current price. Importantly, this expectation is based on the past growth rates of prices in neighbouring areas—overspill.

DiPasquale and Wheaton propose that house prices will be affected by new household formation. Meen (1998) considers the role of demographic change on the UK housing market and how it is modelled. He concludes demography would have no effect on either owner–occupation or prices. It is possible that increased demand (or need) is accommodated by the private rental sector or in social housing. However, he raises concerns about house supply. He finds that price elasticity of housing supply in the UK is low. Unless the nature of the construction industry and the land-use planning system changes substantially, improvements in the economy performance will lead to higher house prices rather than to higher owner–occupier rates. In both Bover et al. (1989) and DiPasquale and Wheaton, it is housing supply that bursts the bubble. If new supply is slow to respond, house prices could rise propitiously before the bubble bursts, suggesting a long ‘carrier wave’ cycle.

2.3.2 International Cycles

Fatas (1997) suggests regional specialisation leads to: asymmetric, industry-specific, shocks; distinct regional cycles; and differences in sensitivity to economic policy initiatives. Marchand (1981) suggests that employment variations at the (Canadian) urban level are affected by a

pervasive business cycle. Local demand conditions that reflect the industrial structure are transmitted through intercity trading ties as minor cycles. This implies that trade is not a driver of common business cycles. At a higher, less integrated level, Camacho et al. (2008) find transmission national cycle through trade, but De Haan et al. (2008) question the integration mechanism of trade. Trade intensity only explains a fraction of business cycle correlation.

By examining business cycles across Eurozone members, Artis and Zhang (1997) test for OCA tendencies. They examine synchronicity and linkage cross-correlations between the German hegemon and ERM members. This core-periphery view among European countries is the prevailing one, yet Camacho et al. (2008) do not find evidence to support this perspective. De Haan et al. (2008) conclude that business cycle synchronisation in Europe increased post-1990, but there is no strong evidence of European business cycles *becoming* more synchronised. Despite membership of a single currency, the emergence of a European cycle is not found.

Wynne and Koo (2000) consider measures of business cycles across 15 EU countries and the USA. They review the correlations of the cyclical component using a Baxter and King filter, capturing up to 8-year cycles in aggregate output. There are many cases of no correlation. The UK cycle is linked to the big economies. Notably, it is not linked to Ireland's. As there is a large open border, this is unexpected. They consider employment cycles. Here, Ireland *is* linked to the UK. They find that inflation is not well synchronised in Europe. However, the UK's prices reflect output in being linked to the big economies. The UK is more strongly linked to the USA than to Europe on these measures.

2.4 Consumption over a Life Time

In their identification of influences on consumption, horizons are considered by Attanasio and Browning (1995). They identify lifetime income effects, cohort effects, life-cycle effects, cyclical effects, and heterogeneity effects. Lifetime income refers to the profile of earnings over the lifetime. Fernández-Villaverde and Krueger (2002) reveal the

lifetime profile of income expenditure for overlapping generations, which turns out to be an inverted-*U* shape. An employment career captures the notion of a progression, where seniority, responsibilities, and salary rise with time. Income rises with age from a low in the 20s. In mid-life, earnings rise to a peak around the age of 55. They then tend to decline, reflecting how some prepare early for retirement.

Eichholtz and Lindenthal (2014) also reveal the inverted-*U* shape in income in English household earnings, with a peak at 52 years. Although income may be different across groups subdivided by qualifications, the inverted-*U* is a common profile. The consumption of housing is tied to this profile. They show that lot size is not important; it is interior space that varies with age, and by implication, income.

Peersman and Pozzi (2007) recommend greater attention to short-term fluctuations in consumption research. Recessions, they find, are characterised by higher consumption sensitivity to income. Coinciding with the liberalisation era, unemployment hysteresis in Europe should discourage consumers' consumption and boost precautionary savings. Sun et al. (2007) show that house prices affect consumption significantly in Singapore. The link found is around 25 quarters, in the business cycle range, rather than longer periodicities where permanent or life-cycle factors would be captured. Contrasting with Peersman and Pozzi, the capital gain effect is stronger during a boom than a recession period.

2.4.1 The Consumption and Housing Nexus

Using UK data, Bagliano and Morana (2010) subdivided house price fluctuations into transitory and permanent. They do not find cointegration among house prices and consumption, also implying no long-term relationship. Using Swedish data and guided by a life-cycle model, Yang and Wang (2012) find that house prices are temporarily affected by transitory shocks (two years) and consumption is more or less immune. It takes two years for house prices to absorb an interest rate shock, whereas consumption responds negatively. Lettau and Ludvigson (2004) find that contrary to conventional wisdom, the vast majority of quarterly fluctuations in asset values are attributable to transitory innovations

that display virtually no association with consumption, contemporaneously, or at any future date. By contrast, aggregate consumption expenditure is affected by permanent changes in wealth. This is consistent with the PIH as the asset value changes are not perceived as permanent.

Li and Yao (2007) find that the young and the old are more house price sensitive than the middle-aged. All increase their consumption following a rise in price but not all benefit. The young see a longer future housing consumption and higher housing costs. Older owners have a short horizon; they seek to capture capital gains to boost non-housing consumption. It is they that experience a welfare benefit from a price rise; the young, lose, with 'breakeven' occurring around the age of 60.

Renters' consumption is affected by house price. Sheiner (1995) finds that young people who rent increase their savings between \$27 and 76 for every \$100 rise in average house price. She concludes that the house purchase down payment is a prime motivator for saving.

Benito and Wood (2005) discuss the impact of house moving on consumption. Using survey data from the British Household Panel Survey, motivated partly to 'match' the characteristics of their newly purchased property, they find two to three times increase in the likelihood of purchasing certain durable goods when moving home compared with a 'stayer'.

2.4.2 Credit Constraints: Constrained Consumption

Bacchetta and Gerlach (1997) consider the impact of credit liberalisation on a range of countries. UK consumption growth is found to be more strongly associated with credit growth than income growth. One possible explanation is that, by relaxing borrowing constraints, the credit liberalisation process increased substantially the desired level of current consumption. In the adjustment period, consumption grows faster than usual.

Campbell and Mankiw (1991) present a simple model to explain consumption that combines permanent and current incomes. A relaxation of a financial constraint allows consumers to behave, as the permanent income hypothesis suggests, smooth over a long horizon. Analysing a collection of developed countries, they find that, apart

from in the UK, liquidity constraints did not decline in importance. Chen et al. (2010) also discuss the implications of two groups within a PIH-LC framework. One group is constrained financially and the other is not. The former is limited to consuming what is currently affordable (cash-on-hand), whereas the other can borrow to smooth consumption across a longer period. Using a threshold model, shifting from one to the other should boost current consumption. A boost to income would increase consumption directly and shift some from less to more creditworthy. A rising dwelling value as a source of additional collateral could be another means of switching. This position has profound implications. The PIH-LC framework posits that consumption should be smoothed relative to income.

To add richness to this analysis, Chen et al. (2010) consider durable and non-durable consumption and unsecured lending. Unsecured lending is found to be unresponsive to house prices. They find that durables are affected by house prices for those that are credit-constrained. Also, durables are affected by changes in incomes. Indeed, Campbell and Cocco (2007) find a significant relationship between real house prices and non-durable consumption growth.

References

- Abbott, A., & De Vita, G. (2013). Testing for long-run convergence across regional house prices in the UK: A pairwise approach. *Applied Economics*, 45, 1227–1238.
- Agénor, P.-R., Prasad, E., & McDermott, C. (2000). Macroeconomic fluctuations in developing countries—Some stylized facts. *World Bank Economic Review*, 14(2), 251–285.
- Agnello, L., & Schuknecht, L. (2011). Booms and busts in housing markets: Determinants and implications. *Journal of Housing Economics*, 20(4), 171–190.
- Aikman, D., Haldane, A., & Nelson, B. (2014, June). Curbing the credit cycle. *The Economic Journal*, 125, 1072–1109.
- Akimov, A., Stevenson, S., & Young, J. (2015). Synchronisation and commonalities in metropolitan housing market cycles. *Urban Studies*, 52(9), 1665–1682.

- Alexander, C., & Barrow, M. (1994). Seasonality and cointegration of regional house prices in the UK. *Urban Studies*, 31, 1667–1689.
- Aoki, K., Proudmand, J., & Vlieghe, G. (2004). House prices, consumption and monetary policy: A financial accelerator approach. *Journal of Financial Intermediation*, 13, 414–435.
- Artis, M., & Zhang, W. (1997). International business cycles and the ERM: Is there a European business cycle? *International Journal of Finance and Economics*, 2, 1–16.
- Ashworth, J., & Parker, S. (1997). Modelling regional house prices in the UK. *Scottish Journal of Political Economy*, 44, 225–246.
- Attanasio, O., & Browning, M. (1995). Consumption over the Life Cycle and over the Business Cycle. *American Economic Review*, 85, 1118–1137.
- Bacchetta, P., & Gerlach S. (1997). Consumption and credit constraints: International evidence. *Journal of Monetary Economics*, 40, 207–238.
- Baglioni, F., & Morana, C. (2010). Business cycle comovement in the G-7: Common shocks or common transmission mechanisms? *Applied Economics*, 42(18), 2327–2345.
- Barras, R., & Ferguson, D. (1985). A spectral analysis of building cycles in Britain. *Environment and Planning A*, 17, 1369–1391.
- Benito, A. (2006, March). *How does the down-payment constraint affect the UK housing market* (Bank of England Working Paper 294).
- Benito, A., & Wood, R. (2005). How important is housing market activity for durables spending? *Bank of England Quarterly Bulletin*, 45(2), 153–159.
- Berg, L. (2002). Prices on the second hand market for Swedish family houses. *European Journal of Housing Policy*, 2(1), 1–24.
- Borgersen, T.-A. (2014a). Housing careers, house price dispersion and the housing market multiplier. *Housing, Theory and Society*, 31(1), 91–118.
- Borgersen, T.-A. (2014b). Equity induced up-trading and the housing market structure. *International Journal of Housing Markets and Analysis*, 7(2), 204–217.
- Borgersen, T.-A. (2014c). Heterogeneous housing markets: Structural implications for pricing and risk. *International Journal of Housing Markets and Analysis*, 7(3), 383–396.
- Bover, O., Muellbauer, J., & Murphy, A. (1989). Housing, wages and UK labour markets. *Oxford Bulletin of Economics and Statistics*, 51, 367–382.
- Calderon, C., & Fuentes, J. (2014). Have business cycle changed over the last two decades? An empirical investigation. *Journal of Development Studies*, 109, 98–123.

- Camacho, M., Perez-Quiros, G., & Saiz, L. (2008). Do European business cycles look like one? *Journal of Economic Dynamics and Control*, 32(7), 2165–2190.
- Campbell, J., & Cocco, J. (2007). How do house prices affect consumption? Evidence from micro data. *Journal of Monetary Economics*, 54(3), 591–621.
- Campbell, J., & Mankiw, N. G. (1991). The response of consumption to income: A cross-country investigation. *European Economic Review*, 35(4), 723–756.
- Carvalho, V., & Harvey, A. (2005). Growth, cycles and convergence in US regional time series. *International Journal of Forecasting*, 21, 667–686.
- Chen, M.-C., Kawaguchi, Y., & Patel, K. (2004). An analysis of the trends and cyclical behaviours of house prices in the Asian markets. *Journal of Property Investment & Finance*, 22(1), 55–75.
- Chen, N.-K., Chen, S.-S., & Chou, Y.-H. (2010). House prices, collateral constraints, and the asymmetric effect on consumption. *Journal of Housing Economics*, 19, 26–37.
- Chen, P.-F., Chien, M.-S., & Lee, C.-C. (2011). Dynamic modeling of regional house price diffusion in Taiwan. *Journal of Housing Economics*, 20(4), 315–332.
- Clarke, B. (2011a, December 14). *First-time buyers and affordability: A fresh perspective* [press release]. Council of Mortgage Lenders. <http://www.cml.org.uk/news/390/>. Accessed 29 June 2015.
- Clarke, B. (2011b, November 16). *What's driving buy-to-let* [press release]. Council of Mortgage Lenders. <http://www.cml.org.uk/news/382/>. Accessed 29 June 2015.
- Clarke, B. (2015, March 5). *New CML data shows nearly half of first-time buyers didn't use the 'bank of mum and dad'* [press release]. Council of Mortgage Lenders. <http://www.cml.org.uk/news/712/>. Accessed 29 June 2015.
- Clayton, J. (1998). Further evidence on real estate market efficiency. *The Journal of Real Estate Research*, 15(1/2), 41–57.
- Cook, S. (2003). The convergence of regional house prices in the UK. *Urban Studies*, 40(11), 2285–2294.
- Cook, S. (2005). Detecting long-run relationships in regional house prices in the UK. *International Review of Applied Economics*, 19(1), 107–118.
- Cook, S. (2012). β -convergence and the cyclical dynamics of UK regional house prices. *Urban Studies*, 49(1), 203–218.
- Cook, S., & Holly, S. (2000). Statistical properties of UK house prices: An analysis of disaggregated vintages. *Urban Studies*, 37, 2045–2051.

- Cook, S., & Watson, D. (2015). A new perspective on the ripple effect in the UK housing market: Co-movement, cyclical subsamples and alternative indices. *Urban Studies*, 53(14), 3048–3062.
- Coulson, N., & McMillen, D. (2007). The dynamics of intraurban quantile house price indexes. *Urban Studies*, 44(8), 1517–1537.
- De Goei, B., Burger, M., Van Oort, F., & Kitson, M. (2010). Functional polycentrism and urban network development in the greater South East, United Kingdom: Evidence from commuting patterns, 1981–2001. *Regional Studies*, 44(9), 1149–1170.
- De Groot, B., & Franses, P. (2008). Stability though cycles. *Technological Forecasting and Social Change*, 75, 301–311.
- De Groot, B., & Franses, P. (2012). Common socio-economic cycle periods. *Technological Forecasting and Social Change*, 79(1), 59–68.
- De Haan, J., Inklaar, R., & Jong-A-Pin, R. (2008). Will business cycles in the Euro area converge? A critical survey of empirical research. *Journal of Economic Surveys*, 22(2), 234–273.
- Dickey, D., Jansen, D., & Thornton, D. (1991). A primer on cointegration with an application to money and income. *Federal Reserve Bank of St. Louis*, March/April, 58–78.
- DiPasquale, D., & Wheaton, W. (1996). *Urban economics and real estate markets*. Englewood Cliffs, NJ: Prentice Hall.
- Dolde, W., & Tirtiroglu, D. (1997). Temporal and spatial information diffusion in real estate price changes and variances. *Real Estate Economics*, 25(4), 539–565.
- Drake, L. (1995). Testing for convergence between UK regional house prices. *Applied Economics*, 29, 357–366.
- Drehmann, M., Borio, C., & Tstasaronis, K. (2012, June). *Characterising the financial cycle: Don't lose sight of the medium term!* (BIS Working Papers No. 380). Bank for International Settlements.
- Eichholtz, P., & Lindenthal, T. (2014). Demographics, human capital and the demand for housing. *Journal of Housing Economics*, 26(2), 19–32.
- Engelhardt, G., & Mayer, C. (1994). Gifts for home purchase and housing market behavior. *New England Economic Review*, May/June, 47–58.
- Fatas, A. (1997). EMU: Countries or regions? Lessons from the EMS experience. *European Economic Review*, 41, 743–751.
- Fernández-Villaverde, J., & Krueger, D. (2002). *Consumption over the life cycle: Some facts from the consumer expenditure survey data* (NBER Working Paper 9382). <http://www.nber.org/papers/w9382>. Accessed 1 Dec 2014.

- Giles, C. (2016, January 10). 35-year mortgages become the norm, Halifax figures show. FT.com.
- Giussani, B., & Hadjimatheou, G. (1991). Modelling regional house prices. *Regional Science*, 70, 201–219.
- Goodhart, C., & Hofmann, B. (2008). House prices, money, credit, and the macroeconomy. *Oxford Review of Economic Policy*, 24(1), 180–205.
- Gray, D. (2012). District house price movements in England and Wales 1997–2007: An exploratory spatial data analysis approach. *Urban Studies*, 49, 1411–1434.
- Gray, D. (2015). Are prices of new dwellings different? A spectral analysis of UK property vintages. *Cogent Economics and Finance*, 3(1), 1–16.
- Gregoriou, A., Kontonikas, A., & Montagnoli, A. (2014). Aggregate and regional house price to earnings ratio dynamics in the UK. *Urban Studies*, 51, 2916–2927.
- Hamnett, C. (1988). Regional variations in house prices inflation, 1969–1988. *The Royal Bank of Scotland Review*, 159, 29–40.
- Ho, L., Ma, Y., & Haurin, D. (2008). House price changes across quality tiers. *Journal of Real Estate Finance & Economics*, 37(4), 299–316.
- Holly, S., Pesaran, H., & Yamagata, T. (2011). The spatio-temporal diffusion of house prices in the UK. *Journal of Urban Economics*, 69(1), 2–23.
- Holmes, M. (2007). How convergent are regional house prices in the United Kingdom? Some new evidence from panel data unit root testing. *Journal of Economic and Social Research*, 9(1), 1–17.
- Holmes, M., & Grimes, A. (2008). Is there long-run convergence among regional house prices in the UK? *Urban Studies*, 45(8), 1531–1544.
- Hui, H.-C. (2011). Cycles in landed and non-landed housing sub-markets in Malaysia. *International Journal of Housing Markets and Analysis*, 4(2), 144–154.
- Iacoviello, M., & Pavan, M. (2013). Housing and debt over the life cycle and over the business cycle. *Journal of Monetary Economics*, 60, 221–238.
- Jadecivicius, A., & Huston, S. (2014). A “family of cycles”—major and auxiliary business cycles. *Journal of Property Investment & Finance*, 32(3), 306–323.
- Jin, C., & Grissom, T. (2008). Forecasting dynamic investment timing under the cyclic behavior in real estate. *International Real Estate Review*, 11(2), 105–125.
- Jones, C., & Leishman, C. (2006). Spatial dynamics of the housing market: An interurban perspective. *Urban Studies*, 43(7), 1041–1059.

- Jones, C., Leishman, C., & Watkins, C. (2003). Structural change in a local urban housing market. *Environment and Planning A*, 35, 1315–1326.
- JRF. (1995, November). *New regional household growth projections create challenges for regional housing and planning policies*. Joseph Rowntree Foundation Housing Research 161. <https://www.jrf.org.uk/file/37464/download?token=oiM0VCDE>. Accessed 4 Apr 2016.
- Leamer, E. (2007). *Housing is the business cycle* (Working Paper 13428). NBER.
- Leamer, E. (2015). Housing is the business cycle: What survives the lessons of 2008–09? *Journal of Money Credit and Banking*, 47(1), 43–50.
- Lee, C.-C., & Chien, M.-S. (2011). Empirical modelling of regional house prices and the ripple effect. *Urban Studies*, 48(10), 2029–2047.
- Lettau, M., & Ludvigson, S. (2004). Understanding trend and cycle in asset values: Reevaluating the wealth effect on consumption. *The American Economic Review*, 94(1), 276–299.
- Levin, E., & Pryce, G. (2009). What determines the price elasticity of house supply? *Real Interest Rate Effects and Cyclical Asymmetries, Housing Studies*, 24(6), 713–736.
- Li, W., & Yao, R. (2007). The life-cycle effects of house price changes. *Journal of Money, Credit and Banking*, 39(6), 1375–1409.
- Liow, K. (2007). Cycles and common cycles in real estate markets. *International Journal of Managerial Finance*, 3(3), 287–305.
- Luea, H. (2008). The impact of financial help and gifts on housing demand and cost burdens. *Contemporary Economic Policy*, 26(3), 420–432.
- Luo, Z., Liu, C., & Picken, D. (2007). Housing price diffusion pattern of Australia's state capital cities. *International Journal of Strategic Property Management*, 11(4), 227–242.
- Marchand, C. (1981). Maximum entropy spectra and the spatial and temporal dimensions of economic fluctuations in an urban system. *Geographical Analysis*, 13, 95–116.
- Mayer, C., & Engelhardt, G. (1996). Gifts, down payments and housing affordability. *Journal of Housing Research*, 7(1), 59–75.
- McDonald, J. (1985). Expectations and urban housing prices. *Urban Studies*, 22, 543–549.
- McGough, T., & Tsolacos, S. (1995). Property cycles in the UK: An empirical investigation of the stylized facts. *Journal of Property Finance*, 6(4), 45–62.
- Meen, G. (1998). Modelling sustainable home-ownership: Demographics or economics. *Urban Studies*, 35(11), 1919–1934.

- Meen, G. (1999). Regional house prices and the ripple effect: A new interpretation. *Housing Studies*, 14(6), 733–753.
- Meen, G. (2011). The economic consequences of mortgage debt. *Journal of Housing and the Build Environment*, 26(3), 263–276.
- Montagnoli, A., & Nagayasu, J. (2015). UK house price convergence clubs and spillovers. *Journal of Housing Economics*, 30, 50–58.
- Morrow-Jones, H., & Wenning, M. (2005). The housing ladder, the housing life-cycle and the housing life-course: Upward and downward movement among repeat home-buyers in a US metropolitan housing market. *Urban Studies*, 42(10), 1739–1754.
- Munro, M., & Tu, Y. (1996). The dynamics of UK national and regional house prices. *Review of Urban and Regional Development Studies*, 8(2), 186–201.
- Oikarinen, E. (2006). The diffusion of housing price movements from center to surrounding areas. *Journal of Housing Research*, 15, 3–28.
- Ortalo-Magné, F., & Rady, S. (2006). Housing market dynamics: On the contribution of income shocks and credit constraints. *Review of Economic Studies*, 73(2), 459–485.
- Peersman, G., & Pozzi, L. (2007, November). *Business cycle fluctuations and excess sensitivity of private consumption* (Bank of England Working Paper No. 335).
- Pesaran, M. H. (2007). A pair-wise approach to testing for output and growth convergence. *Journal of Econometrics*, 138, 312–355.
- Pollakowski, H., & Ray, T. (1997). Housing price diffusion patterns at different aggregation levels: An examination of housing market efficiency. *Journal of Housing Research*, 8(1), 107–124.
- Pritchett, C. (1984). Forecasting the impact of real estate cycles on investment. *Real Estate Review*, 13(4), 85–89.
- Pryce, G., & Sprigings, N. (2009). Outlook for UK housing and the implications for policy: Are we reaping what we have sown? *International Journal of Housing Markets and Analysis*, 2(2), 145–166.
- Pugh, C., & Dehesh, A. (2001). Theory and explanation in international property cycles since 1980. *Property Management*, 19(4), 265–297.
- Pyhrr, S., Roulac, S., & Born, W. (1999). Real estate cycles and their strategic implications for investors and portfolio managers in the global economy. *The Journal of Real Estate Research*, 18(1), 7–68.
- Reed, R., & Wu, H. (2010). Understanding property cycles in a residential market. *Property Management*, 28(1), 33–46.

- Rosenthal, L. (1986). Regional house price interactions in the UK, 1975–81: A cross-spectral analysis. *Applied Economics*, 18, 1011–1023.
- Royal Institute of Chartered Surveyors (RICS). (1999). *UK Property Cycle—A History from 1921 to 1997*. London: RICS Books.
- Sanidas, E. (2014). Four harmonic cycles explain and predict commodity currencies' wide long term fluctuations. *Technological Forecasting and Social Change*, 87, 135–151.
- Scanlon, K., & Whitehead, C. (2011). The UK mortgage market: Responding to volatility. *Journal of Housing and the Build Environment*, 26, 277–293.
- Schularick, M., & Taylor, A. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870–2008. *American Economic Review*, 102(2), 1029–1061.
- Sheiner, L. (1995). Housing prices and the savings of renters. *Journal of Urban Economics*, 38(1), 94–125.
- Shi, S., Young, M., & Hargreaves, B. (2009). The ripple effect of local house price movements in New Zealand. *Journal of Property Research*, 26(1), 1–24.
- Smith, B., & Tesarek, W. (1991). House prices and regional real estate cycles: Market adjustments in Houston. *Real Estate Economics*, 19(3), 396–416.
- Smith, L., & Ho, M. (1996). The relative price differential between higher and lower priced homes. *Journal of Housing Economics*, 5, 1–17.
- Sommervoll, D., Borgersen, T.-A., & Wennemo, T. (2010). Endogenous housing market cycles. *Journal of Banking & Finance*, 34(3), 557–567.
- Spotton, B. (1997). Financial instability reconsidered: Orthodox theories verses historical facts. *Journal of Economic Literature*, 31, 175–195.
- Stein, J. (1995). Prices and trading volume in the housing market: A model with down-payment effects. *The Quarterly Journal of Economics*, 110, 379–405.
- Stevenson, S. (2004). House price diffusion and inter-regional and cross-border house price dynamics. *Journal of Property Research*, 21(4), 301–320.
- Stevenson, S., Akimov, A., Hutson, E., & Krystalogianni, A. (2014). Concordance in global office market cycles. *Regional Studies*, 48(3), 456–470.
- Sun, J., Sim, L.-L., Hin, K., & Ho, D. (2007). The cyclical association of residential housing price and consumption. *Journal of Real Estate Portfolio Management*, 13(3), 219–248.
- Tsai, I.-C. (2014). Ripple effect in house prices and trading volume in the UK housing market: New viewpoint and evidence. *Economic Modelling*, 40, 68–75.

- Tsai, I.-C. (2015). Spillover effect between the regional and the national housing markets in the UK. *Regional Studies*, 49, 1957–1976.
- Tu, Y. (2000). Segmentation of Australian housing markets: 1989–98. *Journal of Property Research*, 17(5), 311–327.
- Wilson, P., & Okunev, J. (1999). Spectral analysis of real estate and financial assets markets. *Journal of Property Investment and Finance*, 17(1), 61–74.
- Wilson, P., & Zurbrugg, R. (2008). Big city difference? Another look at factors driving house prices. *Journal of Property Research*, 25(2), 157–177.
- Wood, R. (2003). The information of regional house prices: Can they be used to improve national house price forecasts? *Bank of England Quarterly Bulletin*, 43(3), 304–314.
- Worthington, A., & Higgs, H. (2003). Co-movements in UK regional property markets: A multivariate cointegration analysis. *Journal of Property Investment Finance*, 21(4), 326–347.
- Wunder, T. (2012). Income distribution and consumption driven growth: How consumption behaviors of the top two income quintiles help to explain the economy. *Journal of Economic Issues*, 46(1), 173–192.
- Wynne, M., & Koo, J. (2000). Business cycles under monetary union: A comparison of the EU and US. *Economica*, 67, 347–374.
- Yang, Z., & Wang, S. (2012). Permanent and transitory shocks in owner-occupied housing: A common trend model of price dynamics. *Journal of Housing Economics*, 21, 336–346.

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