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Housing Cycles in the UK: A historical and empirical investigation

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Abstract

Purpose - The study looks at the characteristics of upswings and downswings for UK housing cycles. Specifically, the purpose of the study is to empirically analyse cycles in house prices and housing affordability on the characteristics of persistence, magnitude and severity.

Design/methodology/approach - The paper draws upon the triangular methodology of cycles. The study utilizes housing data from the last three decades.

Findings – From an empirical perspective the study finds four main results. First, the graphical trajectory of cycles in house price and housing affordability is highly synchronized. Second, on average upturns in both cycles tend to be longer than the busts. Third, the recent upturn and downturn in house price and housing affordability cycle is characterised by larger duration, magnitude and severity than the earlier case. Fourth, the latest downturn of both cycles is highly synchronised in terms of time occurrence, persistence, magnitude and severity and that also for both cases the latest downturn is considerably smaller than the previous. The study additionally indicates that on average the length of a complete house price and housing affordability cycle is 19 years on a peak-to-peak basis.

Research limitations/implications - This paper is essentially exploratory and raises a number of questions for further investigation. There is scope to address the research questions for different geographical definitions. There is also scope to extend the research to examine the causal factors underlying the differences in the phases for persistence, magnitude and severity.

Originality/value - This is among the few papers that analyses cycles in house prices in the UK. This is the first study that draws attention to housing affordability cycle and the first to compare cycles in house prices with cycles in housing affordability.

Keywords Housing cycles, real house prices, housing affordability cycles, property cycles

1. Introduction

Recently the UK housing market alongside with the western housing markets went through an unprecedented and synchronised rise in house prices that turn into the reverse phenomenon i.e. the bust. These events have been repeatedly explained in the literature as phases of an autonomous price cyclical movement. Most of the existing literature in UK property cycles focuses on property investment cycles and commercial cycles in prices and building output (McGough and Tsolacos 1995; RICS 1994; RICS 1999; Barras 2007; Ball, M and Grilli, 1997). Several studies have, however, instigated the residential price cycle for different countries including the UK but such conclusions are not country specific; (Bracke 2013, Angello and Schuknecht 2011, Jaeger and Schuknecht 2007) they rather reflect generalise findings of cyclical characteristics in house prices.

In parallel with the above, existing theory of cycles imply that during house price upturns housing affordability decreases while in period of price downturn affordability increases, and vice versa (Case and Shiller 2003, Himmelberg et al. 2005, Campbell et al 2011, McCarthy and Peach 2004). However existing studies are still not offering a consensus estimate in relation to the size or even the existence of a housing affordability cycle. By filtering the literature we found that among the existing literature the work of Tsai (2013) reveals an interesting house price self-correction pattern that related to the housing affordability cycle.

Initially the purpose of the paper is limited to provide a comprehensive cycle analysis in the UK house prices in the spectrum of duration of the cycle its phases, amplitude, and severity. Moreover it also aims to examine for asymmetrical behaviour of the phases and for cumulative movements within phases. Thereafter the aim of the paper is focuses on modifying the self-correction pattern of Tsai (2013) in order to explain and propose a pattern for housing affordability cycle. On this basis the study looks to investigate housing affordability cycles in the aforementioned spectrums. Finally, the study aims to compare the characteristics of housing cycles in prices and affordability and their time occurrence with the view to examine for any cyclical regularity between them.

The identification in the co-movements of the housing cycles requires the detection of their cyclical components and turning points. To that extent, the study adopts a triangular methodology and utilises data from UK housing national sources. The structure of the paper is organised as follows: The second and third section briefly reviews the definitions and the literature of house price cycles. The fourth section analyses the historical perspective of property cycles in the UK. The next section presents the methodology and the data sets of the study. Section 6 presents the empirical results of house price cycles. The next section proposes the suggested pattern of housing affordability cycle and presents the empirical evidences of the affordability cycle. Section 8 compares and analyse the two types of cycles. Finally the last section draws the conclusions of the study.

2. Defining and describing the property cycle

The theory of cycles is one of the basic human observations of the natural world. Events, economics and political systems move through cycles similar to the natural life-cycles of living beings (Bothamley (2002)). An early definition of a cycle as economic phenomenon was suggested by Burns and Mitchell (1941), “cycles consist of expansions occurring at about the same time in many activities, followed by similarly general recessions, contractions and revivals”. One of the few concise definitions of the property cycle is offered by the Royal Institution of Chartered Surveyors (RICS 1994): “Property cycles are recurrent but irregular fluctuations in the rate of all-property total return, which are also apparent in many other indicators of property activity, but with varying leads and lags against the all-property cycle.” They further clarify that property cycle is not necessarily regular in length, speed or severity.

Baum (2000) attempts to simplify it by describing property cycles as a tendency for property demand, supply, prices and returns to fluctuate around their long-term trends or averages. He further suggests that, “prices in all markets go up and down. Inefficiency in real estate markets makes these up and down movements look like a repeatable, cyclical, pattern”. Another observer, Wheaton (1999), suggests that a property cycle involves repeated oscillations of a market, as it continually overshoots and then undershoots its own steady state. Among popular explanations of the property cycle with reference to the UK market is developed by Barras (1983), (1994), (2005), (2009). He proposes that property markets behave cyclically in the long run, primarily because of building lags in relation to demand changes for space that are mainly determined by the fluctuations of business activity. An alternative explanation regarding boom-bust cycles is provided by Stoken (1993) and Shiller (2005). They suggest that boom and bust cycle theories are not theories in their own right since major events aid to trigger major cycles in property markets; that in turn often explained by irrational human or crowd behaviour.

In respect to the phases consists a property cycle several studies revealed different phases. An early study made by Hoyt (1933) recognised four distinct phases of market behaviour in the property cycle, that is, boom in demand, prices on the rise, boom in construction and finally, bust. Mueller and Laposa (1994) suggest that there are four phases in property cycles, recession, recovery expansion and contraction (oversupply). Campbell and Trass (2011) simply these phases as boom, slump and recovery. An alternative approach to the conceptualization of property cycle phases is proposed by Pyhrr et al (1990, cited in Pyhrr et al 1999). They suggest that a cycle consists by peak, declining, trough, and rising phases. Baen (1994) developed a generalized risk analysis model and decision matrix for global property investments. His study advanced the theory that there is one generalized, theoretical property cycle and that each property market within each country is

located separately on this 'conceptual' cycle, in the context of five market phases: recovering, improving, maturing, overbuilt and falling.

3. Overview of the literature

With reference to previous work the length of a property cycle is examined on the basis of two phases, upswing and downswing (Case and Shiller 1994; Bry and Boschan 1971; Angello and Schuknecht 2011; Harding and Pagan 2002; Bracke 2013 and RICS 1994).

So far most of the research into the UK property cycles has been limited to the commercial property market sector (McGough and Tsolacos 1995; RICS 1994; RICS 1999; Barras 2007; Ball, M and Grilli, 1997). Bracke (2013) is among the few studies that concentrate on housing cycles. The paper analysed data for nineteen countries including the UK. The data stretches from 1970 to 2010. Findings of Bracke (2013) reveal that on average upturns in international cycles are longer than downturns. Other related studies include the work of Angello and Schuknecht (2011). This study utilised data from eighteen industrialised countries, including UK over the period 1980-2007. Their analysis is based on real housing prices annual data as provided by the Bank of International Settlement (BIS). Similarly, Jaeger and Schuknecht (2007) examined the duration of boom and bust phases in the content of fiscal policy for twenty industrialised countries. They also utilises data from BIS. It is noteworthy that the findings of these studies are not elusive at a country specific level as the conclusions related to the characteristics of house price cycle is drawn from international level.

Differentiate from this, Murph (1997) and Reed and Wu (2010) highlight the importance of housing affordability in the content of cyclical markets. Existing theory of cycles imply that during house price upturns housing affordability decreases while in period of price downturn affordability increases, and vice versa (Case and Shiller 2003, Himmelberg et al. 2005, Campbell et al 2011, McCarthy and Peach 2004). Nevertheless, existing literature does not offer a consensus estimate in relation to the size or even the existence of a housing affordability cycle. In relation to this, however, the study of Tsai (2013) provides an initial understanding to this topic. His study proposes and explained how affordability causes a driving force for self-occupancy demand and how this influences the direction of price.

The identification in the co-movements of cycles requires detection of cyclical components and turning points. To that degree previous literature advise us that the triangular methodology as proposed by Harding and Pagan (2002) is among the most widely used approaches (Bracke 2013, Jaeger and Schuknecht 2007,

Angello and Schuknecht 2011. Generally over the last years there was a flourish of studies and publications on the characteristics of house price cycles. Such studies have instigated house price cycle in different countries including the UK (Bracke 2013, Angello and Schuknecht 2011, Jaeger and Schuknecht 2007); however the conclusions drawn are not concerned to a specific country. Also, consideration on the cyclical behaviour of UK housing affordability has been overlooked.

4. Cyclicity in the UK property market

4.1 The 1950s and 1960s (1954-1964) meanwhile!

According to Solomou (1998) the 1950s and 1960s were a period of economic stability. RICS (1999) argues that the property market was less volatile during that period. In supporting this, Wellings (2006) report that throughout the 1960s the growth of house prices was stable with an average rate between 5% and 10%. However, the average performance of property assets during the development boom of 1955-1964 was less profitable than ordinary shares, but better than government bonds. Respectively, the returns were 7% for property, 0.7% for bonds, and 10.2% for ordinary shares. (Scott 1996). Bullock (1987) argues that during the 1950s and 1960s there was a boom in flat type housing. This boom was supported by the Town and Country Planning Act changes of 1953 and 1954, by the high occupation demand and by the large funds and low interest rates that were available (Fraser 1993). In light of this situation the introduction of the Brown Ban in 1964 “announced” the end of the development boom period that had lasted for 10 years. (Scott 1996) (Fraser 1993) (Porter 2000).

4.2 The 1970s

Due to the strict credit conditions introduced by the Labour Government in 1968, the 1970s started with a small decline in property values. In June 1970, the conservatives took control under Edward Heath. The main target of the new government was to curb inflation and regenerate the industrial sector and productivity. Initially, they adopted a strict monetary and fiscal policy. Soon the government switched their policy to an all-out expansion using all available resources in order to beat inflation, by increasing production (Fraser 1993). Under such conditions, the industries were encouraged to reinvest and expand their businesses in the belief that economic growth would be sustained without deflationary measures (Fraser 1993). Although the Government's strategy was to encourage investment in manufacturing industry to improve the export

balance, much of the available funds found its way into property and speculation (Cadman 1984). The fall of the bank rate on 1st of April in 1971, the relaxation of bank requirements for lending and the expansion of country's budget in March 1971 was the inflected point (Fraser 1993). Particularly, the Competition and Credit Control agreement (CCC) operated by the Bank of England in 1971 marked the beginning of the deregulation process between banking institutions (Matthews et al. 2007). The increased money supply gave rise to a "strong" but brief increase in economic activity during 1971-1973, the so so-called 'Barber Boom' (Perez and Westrup 2008, Brett 1997, and Scott 1996).

In the early 1970s property lending jumped from £362 million in February 1971, to over £2.5 billion in February 1974. (Scott 1996) (Papadopoulos and Vlamis 2008). Inflows of capital rose and policies in favor of income allowances became more frequent during these period (Scott 1996). During the period 1965-1973, property returns performed well. The average rate of return was 15.1% compared to 9% for ordinary shares and 3.2% for bonds. From 1968-1970 property returns exceeded the inflation rate by 10.65% and in 1971-1973, the return rose by 14.20% (Scott 1996). In terms of scale of this increase Wellings (2006) and Fraser (1993) described these changes as unprecedented high. In parallel, between 1967-1973 landlords have realized for first time the influence of inflation in rental values and the rent review period stated to decline to 14 years and then to 7 years and finally to today's 5 years period (Brett 1997).

From 1971 onwards the imports from foreign manufactures increased dramatically and an imbalance of payments occurred (Fraser, 1993). In October 1973 the oil crisis ¹started, and the effects were immediate. As such, Bank of England, in November 1973, raised the minimum-lending rate to 13% (Wellings 2006). In December, government announced the proposals of Capital Gains Tax rates. The new taxes, together with the sudden increase of the interest rates acted as a threat for the liquidity of the property companies (Fraser 1993). The Government measures on 17th of December 1973 to a impose a restriction on personal loans, public expenditure cuts, and 10% surtax (Scott 1996) caused demand for investment in property sector to disappear "overnight" (Fraser 1993).

On this new parameter of a property market slump, the crisis of secondary banking erupted (Cadman 1984). In 1974 a secondary bank "London and Country Securities" collapsed and led to the collapse of two others (Cadman 1984, Scott 1996). The secondary banks collapse in 1974 created fears for a generalized crisis of the financial system (Papadopoulos and Vlamis 2008). This led the Bank of England to announce a rescue plan called "Lifeboat". In total, 26 secondary banks were supported with a grant up to £1.3 billion in loans. In exchange of that, the

¹ On 6th October 1973, "Yom-Kippur war" started. On 17th of October in 1973 Arab countries decided to apply an oil export embargo and cuts in production (Campbell 2005, Hellema et al. 2004).

financial system was prevented from the subsequent consequences. However, that came with a cost for both the Bank of England and the clearing banks that took part in this rescue plan (Goodhart (1995, Balchin et al (1995).

In 1974 the first property boom collapsed. The end of the property boom that had lasted almost uninterrupted since 1945 reminded that property prices are cyclical (Balchin et al. 1995 and Scott 1996). By 1974 private housing orders decline 50% (Wellings 2006) while during 1974-1980 both shares and bonds outperformed property returns for the first time since the end of the Second World War (Scott, 1996). By 1977 the UK property market showed signs of recovery following a brief price expansion until 1981 (Scott 1996).

4.3 The 1980s to mid 1990s

The early 1980s can be characterized as one of the worst period of industrial disinvestments, unemployment and uncertainty for property sector (Rydin 1998, Brett 1997, Clara 1993). By 1983 unemployment in UK rose approximately to three million. During this period the government introduced two major policies, Enterprise Zones and Urban Development Corporations with the view to reorganise development control and planning in accordance with a more market oriented and entrepreneurialism approach (Reitan 2003). The economic background between 1982-1986 saw low inflation and steady growth of UK economy together with rising confidence. In mid 1980s a banking deregulation together with the abolishment of lending constraints have encouraged competition among UK banks. Traditionally, mortgages have been predominately in the form of first advances for the purchase of a house. In the mid 1980s second mortgages and further advances were given relatively easy to owner-occupiers via the introduction of house equity withdrawal (Buckle and Thompson 2004, Dolphin and Griffith 2011). Through the equity withdrawal a consumption boom was supported in the later half of the decade (Buckle and Thompson 2004). Fraser (1993) note that between 1982-1986 bank lending to property firms grew at over 25% per annum. During that time frame a property recovery started in London's real estate market and thereafter literally spread out like a "ripple". Vacancy rates in City London decline from 8% in 1984 to 2.25% in 1987. The markets rents increased by over 50% in real terms between 1985-1989 (Scott 1996). Between 1986-1989 UK house prices almost doubled where as between 1983-1987 house prices grow on average 12% per annum (Balchin et al. 1995, Wellings 2006).

The era of 1980s revealed that property cycles became truly global phenomenon (Barras 2005). In the wake of this, the integration of real estate markets and capital markets after the 1980s has created a new situation where financial and macroeconomic impacts on property were greater (Barras 2009). During the booming years, foreign investors such as Japanese, Scandinavians, Americans

and Middle Eastern showed great interest in the UK property market. According to Fraser (1993) the main reasons that led to that massive expansion of credit by foreign Banks caused due to the following reasons: The removal of Exchange controls and the deregulation in the UK, Europeans and elsewhere-banking system led to a globalization of the financial markets. Also, major overseas banks sought to establish a well-diversified portfolio of loans worldwide. European Banks sought a European Union (Community) diversification and Britain was one place for this. In addition, London became the European financial center. Between Black Monday and December 4th in 1987 property shares fell by almost 30% in absolute terms. Balchin et al. (1995) highlight that; surprisingly the stock market collapse in October 1987 had little immediate influence on property values in the UK as values continued to increase and reach a peak in the first quarter of 1990.

In the early 1990s, UK economy went into recession and interest rates begun moving up in order to squeeze inflation out of the system (Fraser 1993). Fraser (1993) Scott (1996) and Brett (1997) agree that the peak of housing completions have coincided with a downturn in tenant demand and as the economy moved into recession a fall in property values inevitably occurred. Following this conditions the mortgage rate in the UK in March 1990 climbed to 15.4% (Wellings 2006).

The light of hope that British economy could avoid a deep recession was dismissed as Saddam Husain invades in Kuwait in July 1990. The result was the same as in the Yom Kippur War. Oil price increased dramatically and loss of business confidence occurred (Fraser 1993). According to Vlamis (2007) and Roy and Clarke (2005) the entrance of the United Kingdom's currency into the European Rate Mechanism on 8th of October 1990 triggered the overall failure of the UK economy. Meanwhile, lending institutions were becoming highly concerned regarding their non-performing loans; by 1991 few property companies went into receivership, while in 1992 Olympia and York was placed into administration (Scott 1996, Pugh and Dehesh 2011).

The exit of UK sterling from Exchange Rate Mechanism (ERM) in 1992 cause interest rates to fall. In light of this property market begun to stabilized. By the 1993 foreign investors began to invest in UK property market (Scott 1996, Brett 1997). Outstanding bank loans to real estate companies that had peaked over £41 billion in May 1991, eventually fall to £33.5 billion by March 1994. The year of 1996 signaled the end of the recession and the year of recovery for the national housing market.

4.4 The mid 1990s to 2008

Following the recovery year of 1996 the UK housing market went into a price expansion phase, which became profound in the mid to late 2000s. Low interest rates, strong levels of employment and availability of credit led residential values in the UK to escalated further. Between 2001-2003 Bank of England base rate fell from 6% to 4%. Between 2005-2007 it was observed that global borrowing access had increased due to the global credit availability. Lending criteria became less strict for borrowers and new mortgage techniques emerge to satisfy market demand. In such economic conditions, UK average house price grow by £107,000 between 1999-2007. In the wake of the global financial crisis, the year of 2008 signaled the end of the expansion phase and the beginning of the recession phase for the UK housing market (Adair et al. 2009).

5. Methodology and data

5.1 Methodology

The paper adopts the “triangular methodology” as proposed by Harding and Pagan (2002) which extends the BB algorithm developed by Bry and Boschan (1971). The triangular methodology describes the cyclical turning points as follows. Locations corresponding to turning points in the original series are determined by identifying shifts in the level of rate of change. The sequence $[Dx_t > 0, Dx_{t+1} < 0]$ signals a local *Peak* in the series occurring at time t , while the sequence $[Dx_t < 0, Dx_{t+1} > 0]$ identifies a local *Trough* occurring at time t . The length of cycle is computed on both Peak-to-Peak and Trough-to-Trough. The cyclical Peaks and Trough are placed at the highest and lowest points of the cyclical fluctuation (Bry and Boschan 1971) using the above sequence.

Based on the “triangular methodology” we apply the approach of Angello and Schuknecht (2011) to define the characteristics of the cyclical phases of upswing and downswing in terms of magnitude, persistence and severity. The persistence (i.e. duration) of each phase is calculated as the temporal distance within the beginning and the end of each phase. The magnitude is defined as the size of price change within the beginning and the end of each turning point. Finally, the severity is computed by combining persistence and magnitude for each phase i via a triangle where the base represents persistence (D_i) and height the magnitude (A_i). Hence, the severity is computed as $C_i = (D_i \wedge A_i) \wedge 0.5$.

5.2 Data Description

This paper utilised data on real house price as provided by the Nationwide statistics over the period of 1980-2014 for the United Kingdom. The data series spans from the first quarter of 1980 to the last quarter of 2014. House price series have been converted to annual figures on the basis of the average price per annum in order to reduce noise from short term “interruptions” of long-term trends. Data for UK housing affordability is provided by the Halifax statistics on a quarterly basis over the period of Q2 1983 to Q4 2014. Data for affordability is presented in the form of debt-burden ratio. The data has been converted into annual ratios on the basis of the average ratio per annum. Both data sets are used on the basis of the rate of change.

6. Empirical results of House Price Cycle

The empirical analysis is applied by the above-discussed methodology. The results reveal episodes of upswings and downswings for the UK housing market over the period of 1980-2014. The identified upswings and downswings episodes and their characteristics in terms of persistence, magnitude and severity are reported in Table 1 and Table 2. The upswings and downswings phases over the selected time are indicated in Fig. 1. Upswings are indicated with the solid line and downswings are indicated with the broken line. Table 3 indicates the length of the house price cycle.

6.1 House Price Cycle

The empirical analysis of the house price data over the term 1980-2014 reveals two upswings and two downswings phases for the UK housing market. The upswings include the period time of 1983-1989 and 1996-2007. The downswings were found to be between 1990-1995 and 2008-2009, 2011-2012. The downswing period in the later case was interrupted by the middle year in 2010.

On average upturns tend to be longer than downswings. Principally, on average, upswings are last for 9.5 years where downswings last for 5 years. The earlier upturn² in UK house prices was characterised by an extraordinary long duration, magnitude and large severity. The persistence, the magnitude and the severity of the latest upturn³ had increased almost twice compare to the 1980s upturn. In respect for the downturn phases the analogy is not the same. The persistence of the downturn of 1990-1995 lasted for two years longer than that of the earlier case (2008-2009,2011-2012). The price magnitude and severity had declined almost twice as much as the first slump of the new millennium. By comparing the magnitude *differentiation* between each upswing period with its followed downswing we yield some further interesting results. The total price decline for

² 1996-2007

³ 1996-2007

the downswing period of 1990-1995 was circa 70 per cent as a proportion to its prior price appreciation of the 1980s upswing⁴. While one would have plausibly expected that the level of price decline for the followed downswing period of the later upturn case⁵ would have followed a similar analogy, the results are vastly different from that. The followed downturn phase of the later upswing (i.e. 1995-2007) accounts for about twenty five per cent as a proportion of its previous upturn.

Table 3 reports the full length for the recent completed house price cycle. With reference to the peak-to-peak turning points the length is nineteen years spanning from the peaking years of 1989 to 2007. For a complete cycle on a pure trough-to-trough level the length is fifteen years (i.e. 1995 to 2009). Yet, by excluding the interrupted year of 2010 the length of the trough-to-trough cycle is eighteen years.

Figure 1. UK Real House Price Changes Between 1980-2014

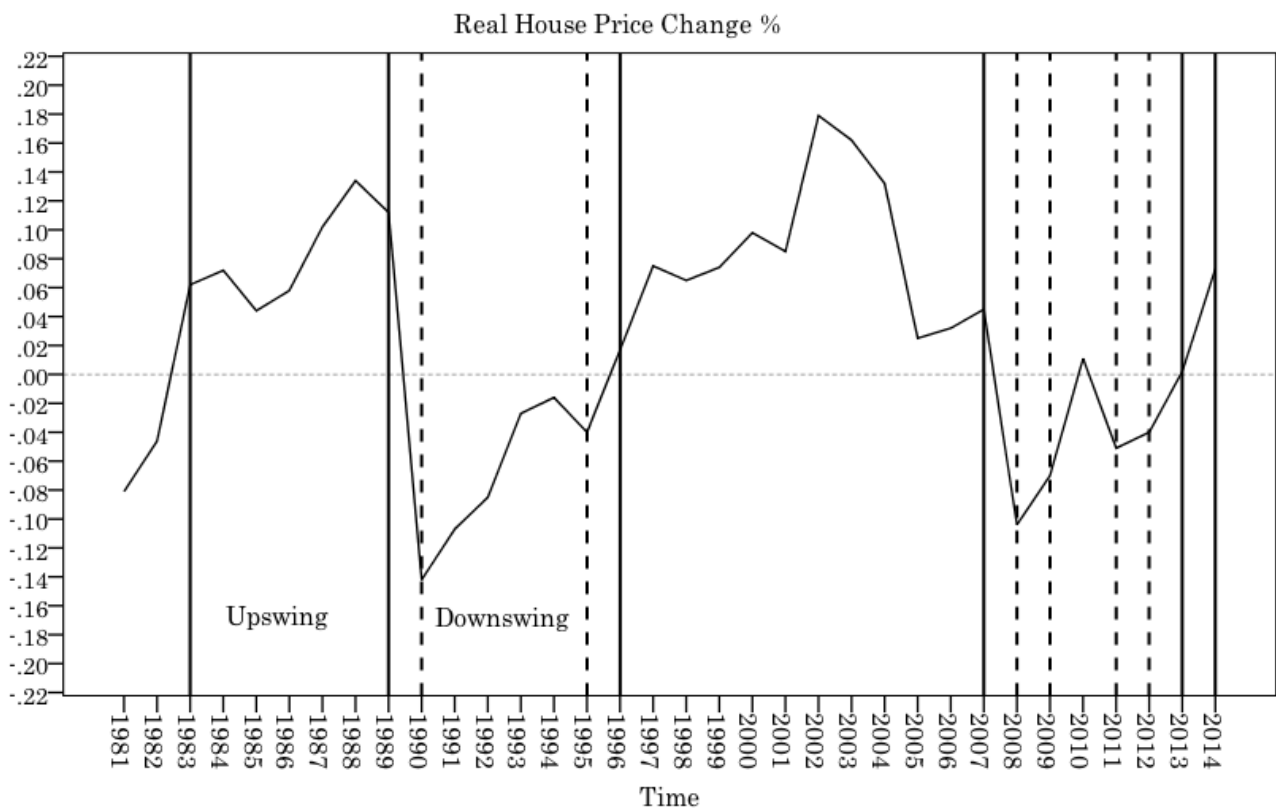


Table 1. Upswing in the UK Real House Prices

⁴ 1980s upswing, 1983-1989

⁵ Upswing period of 1996-2007

Years	Persistence ⁶	Magnitude	Severity
1983-1989	7	58.4	204.4
1996-2007	12	98.9	593.4

Table 2. Downswing in the UK Real House Prices

Years	Persistence	Magnitude	Severity
1990-1995	6	-41.7	-125.1
2008-2009 and 2011-2012 ⁷	4	-26.5	-53.0

Table 3. Duration of UK housing cycles in Years

Turning Points ⁸	Years	Length
Peak-to-Peak	1989-2007	19
Trough-to-Trough ⁹	1995-2012	18
Trough-to-Trough	1995-2009	15

7.0 Housing affordability cycle

⁶ Years

⁷ The downswing period was interrupted in the year of 2010. In 2010 UK Real House Prices rose slightly by 1.1%.

⁸ Peaks and Troughs are identified by the triangular methodology (sequence) as provided by Harding and Pagan (2002)

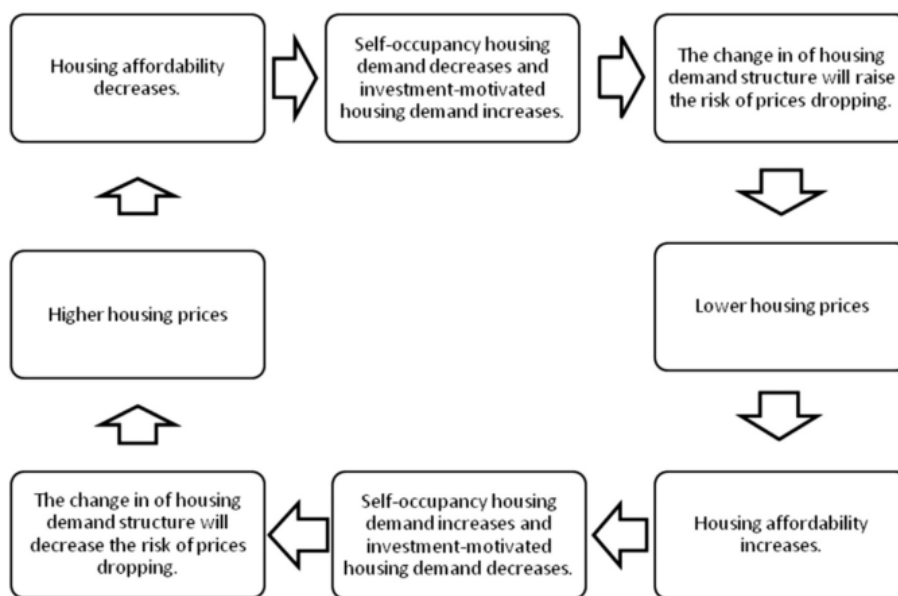
⁹ By excluding the interrupted year of 2010 the trough point is the year 2012

Does housing affordability have a cycle? Is such cycle comparative to the housing cycle? An examination of the existing literature relating to property cycles does not offer a consensus estimate of the size, or even existence, of the housing affordability cycle as a phenomenon. Not surprisingly, a comparative analysis between house price and housing affordability cycle has not been previously reported. Tsai (2013) in an attempt to observe whether housing demand explains house price dynamics he hypothesized an interesting self-correction pattern concerning housing demand in the consent of affordability. His proposed pattern provides a good starting point for describing the cyclical stages of what can be defined as a housing affordability cycle.

Figure 2 reveals the house price self-correction pattern (SCP) of Tsai (2013). The SCP in Figure 2 illustrates the cyclical pattern that house prices follow during the self-correction process.

It also describes how affordability causes a driving force (in the SCP) and what are the effects on both self-occupancy and investment-motivated demand.

Figure 2. Tsai (2013) self-correction pattern in housing prices



The remaining part of this section hypothesizes the cyclical pattern of housing affordability, which parallels that in the house prices, but is also subject to its own autonomous influences. Initially, it is worth to clarify that the proposed hypothesis focuses on the one side of Tsai (2013) demand structure, that is, the

self-occupancy demand. The rationality behind this choice relies on the fact that most housing affordability indices are made to illustrate the ability of first-time buyers or typical households to purchase a house. Therefore, it implies that most affordability indices estimate the demand in the perspective of self-occupancy.

In light of this, we modify the house price self-correction pattern of Tsai (2013) in order to shape the pattern of a housing affordability cycle. The modification is done by excluding the investment-motivated demand and hence by isolating self-occupancy demand. Self-occupancy demand is used to explain the pattern of a housing affordability cycle:

1. The starting point is a drop in house prices. This causes higher housing affordability¹⁰ and rise in self-occupancy demand.
2. As affordability and self-occupancy demand increase, the risk of price dropping is decreased which implies that a new upturn in house prices is underway.
3. Strengthening of demand increases house prices. An increase in house prices reduces¹¹ housing affordability and self-occupancy demand decreases.
4. The deterioration of housing affordability and the reduction in self-occupancy demand increases the risk of price dropping. By that time the price cycle is moving into its downswing phase.

The above-mentioned sequence describes the pattern of the affordability cycle, which parallels those in house prices but is also subject to its own autonomous influences.

7.1 Data and approach

¹⁰ Higher or Increase of affordability is translated as a decrease in the housing affordability benchmarks (i.e. house price to income ratio).

¹¹ Decrease of affordability implies an increase in the housing affordability index (i.e. house price to income ratio)

This section uses data of house price to earning (HPE) ratio to reflect the cyclical pattern of housing affordability over the period of 1984-2014 for the United Kingdom. Data for HPE ratio is provided by the Halifax statistics on a quarterly basis. The data stretches out between the second quarter of 1983 to the last quarter of 2014. HPE ratios have been converted to annual percentage figures on the basis of the average ratio per annum in order to reduce noise from short term “interruptions” of long-term trends. This section follows the approach that reported in section 5.1.

7.2 Empirical results of Housing Affordability Cycle

The analysis of the UK housing affordability cycle concentrates on issues of persistence, magnitude, and severity on both upswing and downswing levels. It also concerns with its cycle total length. Figure 3 gives a visual sense on the cyclical performance of housing affordability in the UK. Table 4 and 5 report the upswings and downswings of HPE in respect of the persistence, magnitude and severity. In Table 6 we report the length of the complete UK housing affordability cycle on both Peak-to-Peak and Through-to-Trough.

Before reporting the results it is necessary to clarify that upswings in HPE ratio show worsening of housing affordability while the downswings reveal betterment in housing affordability levels. Over the study term, we found two upswings and two downswings phases for the UK housing affordability. The upswings include the period time of 1985-1989 and 1999-2007. Downswings comprise the period between 1990-1996 and 2008-2009, 2011-2012. Likewise to the UK house price cycle the downswing period of affordability in the later case; was interrupted in 2010 before it ends in 2012. The interval period between 1997-1998 it has not been attached to a phase as it involves an unchanged situation. On average upturns in HPE are longer than downswings. Upswings tend to last for 7 years where downswings last on average for 5.5 years.

The mid to late 1980s upturn in HPE lasted for five years where the later upturn lasted for nine years. By comparing these two upturns on the cycle’s characteristics of magnitude and severity we found that the 1999-2007 upturn was almost two times larger than that of the 1985-1989. When comparing the two downturn phases the results are opposite. Particularly our study finds that the earlier downswing (i.e. 1990-1996) was lasted for three years longer compare to the latest affordability downturn (i.e. 2009-2009,2011,2012). Following the above comparison, the magnitude was 1.5 times larger whereas the severity was almost 2.5 times higher.

By associating the magnitude *differentiation* between each upswing period with its followed downswing we yield interesting descriptive conclusions. The total

decline of HPE in the downswing period of 1990-1996 was approximately 120 per cent as a proportion to its prior upswing. However the followed downswing phase of the later upswing (i.e. 1999-2007) accounts for only about 40 per cent. Pertaining to the length of a complete housing affordability cycle the study finds that the length is nineteen years on a Peak-To-Peak basis and seventeen years when it measured on a Trough-To-Trough.

Figure 3. UK HP to earnings ratio, Changes in %, Between 1980-2014

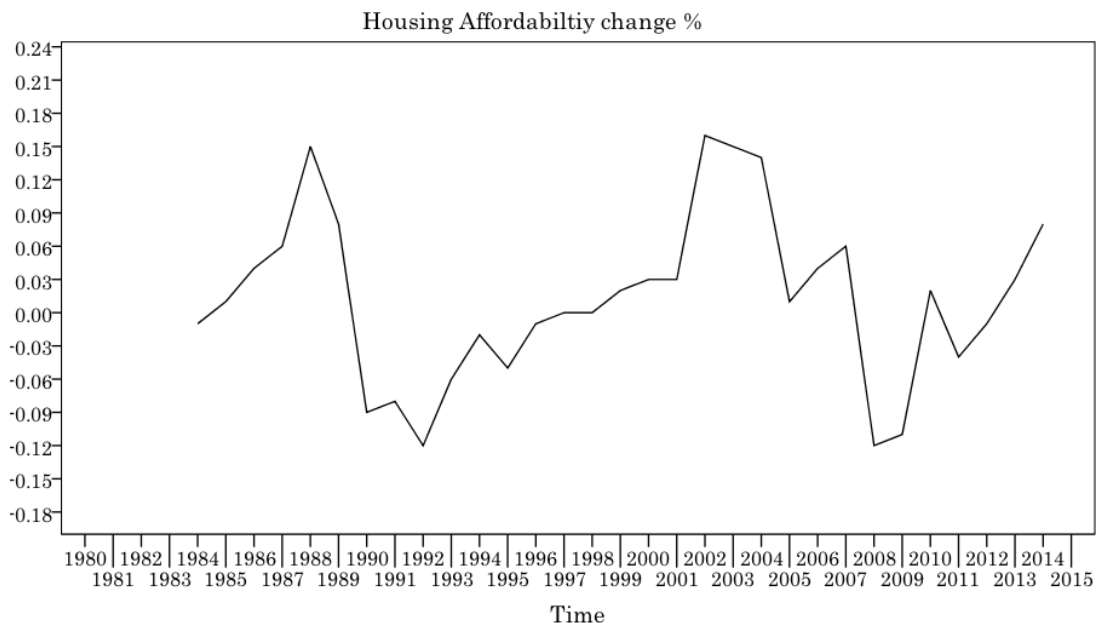


Table 4. Upswing in HPE

Years	Persistence	Magnitude	Severity
1985-1989	5	34.0	85.0
1999-2007	9	65.0	292.5

Table 5. Downswing in HPE

Years	Persistence	Magnitude	Severity
1990-1996	7	-42.0	-147.0
2008-2009 and 2011-2012	4	-28.0	-56.0

Table 6. Duration of the UK Housing affordability cycle

Turning Points ¹²	Years	Length
Peak-to-Peak	1989-2007	19
Trough-to-Trough ¹³	1996-2012	17
Trough-to-Trough	1996-2009	14

8.0 House Price vs. Housing affordability cycle

The purpose of this section is to provide a descriptive comparison analysis between the cycle of house price and housing affordability. Initially, the analysis concentrates on the graphical trajectory of these two cycles. Then, it seeks to investigate their characteristics at both cycle and phase level. To this end, Table 7 comprises the results for house price and housing affordability cycle.

Fig 4 illustrates a comparison of the changes of the two indicators; house price and housing affordability. The change of housing prices has been fluctuating around the shift of housing affordability. Evidently, the shift of house prices was circa in perfect cyclical synchronization with that of housing affordability indicator. In terms of the magnitude, the harmonisation it seems that has been slightly violated in the period of 1996-2001; however, their direction was approximately consistent.

¹² Peaks and Troughs are identified by the triangular methodology (sequence) as provided by Harding and Pagan (2002)

¹³ By excluding the interrupted year of 2010 the trough point is the year 2012

Fig.4 House price and Housing affordability: A cycle's comparison

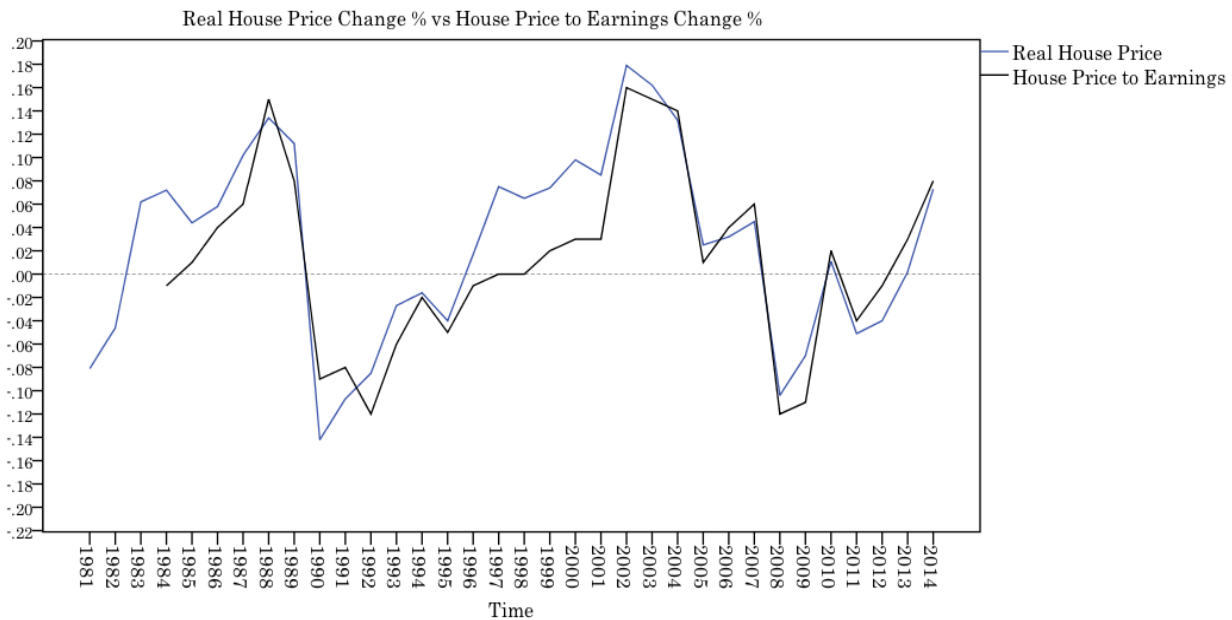


Table 7 matches the total length for both types of cycles by measuring them on a peak-to-peak (PP) and trough-to-trough (TT) duration. Their identified upswings and downswings and their features in terms of persistence, magnitude and severity are reported also in Table 7.

When looking on the length of each cycle, it is noteworthy that their total length is exactly the same in a peak to peak. This is justified by the simultaneous occurrence of both cycle's peaking points. In a trough-to-trough level their length is separated by one year. Turning in some more detail to the results in Table 7 we found that the upswing for both cycles in the later case was more prolonged in terms of persistence. The study also reveals that the later case of upswing for both cycles was characterised by extraordinary magnitude and severity. For both cases, the later downswing had lower persistence, magnitude and severity when compared with its earlier. It is also notable that the downswings of both cycles had similar performance when they have been compared for persistence, magnitude and severity.

Table 7.0 House Price vs. House Affordability cycle – A large-scale comparison

Cycle	Upswings			Downswings			Length of Cycle	
	Persistence	Magnitude	Severity	Persistence	Magnitude	Severity	Peak-to-Peak	Trough-to-Trough
House Price							19	18
1983-1989	7	58.4	204.4	-	-	-	-	-
1996-2007	12	98.9	593.4	-	-	-	-	-
1990-1995	-	-	-	6	-41.7	-125.1	-	-
2008-09,11-12	-	-	-	4	-26.5	-53.0	-	-
Housing Affordability							19	17
1985-1989	5	34.0	85.0	-	-	-	-	-
1999-2007	9	65.0	292.5	-	-	-	-	-
1990-1996	-	-	-	7	-42.0	-147.0	-	-
2008-09,11-12	-	-	-	4	-28.0	-56.0	-	-

9.0 Conclusion

This study looks at cycles in UK real house prices and housing affordability over the period of 1980s-2000s. The analysis focuses on the spectrum of duration of the cycle and its phases, amplitude and severity. It also aims to examine for asymmetrical behaviour of the phases and for co-movements between the two types of cycles. The analysis of these episodes from a historical perspective leads to some interesting conclusions.

For the UK house price cycle, on average, upturns tend to be longer than downswings. Principally, on average, upswings are last for 9.5 years where downswings last for 5 years. The latest upturn in UK house prices was increased almost twice compare to the 1980s upturn in terms of persistence, magnitude and severity. In respect to the downturn phases the analogy was reverse. The persistence of the price downturn of 1990-1995 lasted for two years longer than that of the latest case (2008-2009,2011-2012). The price magnitude and severity had declined almost twice as much as the first slump of the new millennium. By comparing the magnitude *differentiation* between each upswing period with its followed downswing we yield some further interesting results. The total price decline for the downswing period of 1990-1995 was circa 70 per cent as a proportion to its prior price appreciation of the 1980s upswing. While one would have plausibly expected that the level of price decline for the followed downswing period of the later upturn case would have followed a similar analogy, the results are vastly different from that. The followed downturn phase of the later upswing (i.e. 1995-2007) accounts for about twenty five per cent as a proportion of its previous upturn.

Pertaining to the UK housing affordability cycle our findings reveal similar results with house price cycle. On average upturns are longer than downswings. Upswings tend to last for 7 years where downswings last on average for 5.5 years. By comparing the latest two upturns of HPE on the basis of magnitude and severity we found that the 1999-2007 upturn was almost two times larger than that of the 1985-1989. When comparing the two downturn phases the results are oppose. Particularly our study finds that the earlier downswing (i.e. 1990-1996) was lasted for three years longer compare to the latest affordability downturn (i.e. 2009-2009,2011,2012). Following the above comparison, the magnitude was 1.5 times larger whereas the severity was almost 2.5 times higher. The total decline of HPE in the downswing period of 1990-1996 was approximately 120 per cent as a proportion to its prior upswing. However the followed downswing phase of the later upswing (i.e. 1999-2007) accounts for only about 40 per cent.

By comparing the two cycles our study finds four interesting results. First, the graphical trajectory of cycles in house price and housing affordability is highly synchronized. Second, on average upturns in both cycles tend to be longer than the busts. Third, the recent upturn in house price and housing affordability cycle

is characterised by larger duration, magnitude and severity than the earlier case. Fourth, the latest downturn in both cycles is highly synchronised in terms of time occurrence, persistence, magnitude and severity and was lower than the previous downturn. Additional results indicate that on average the length of a complete house price and housing affordability cycle is 19 years on a peak-to-peak basis. These evidences suggest that a high regularity exist between the two types of cycles.

This paper is essentially exploratory and raises a number of questions for further investigation. There is scope to address the research questions for different geographical definitions. There is also scope to extend the research to examine the causal factors underlying the differences in the phases for persistence, magnitude and severity. This is among the few papers that analyses cycles in house prices in the UK and the first study that draws attention to housing affordability cycle. This paper is also helpful for providing an initial understanding on the relationship between the cycles of house price and housing affordability.