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*Understanding Irish house price movements -
a user cost of capital approach*

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Non Technical Summary

Given the property market's capacity to influence developments in the macro-economy, the banking system and the labour market, it is important to understand the drivers of housing cycles. This paper uses the user cost of capital (i.e., UCCh) framework to describe Irish house price dynamics since 1980. The user cost of capital compares the cost of accessing a given bundle of housing services via homeownership rather than renting in the private market. All the cost outlays of home ownership incurred each period can be brought together in the user cost of capital in housing. This variable can be measured from its constituent parts with varying degrees of detail. The approach adopted in this paper is to construct an estimate of the user cost from its detailed components. This has the advantage that the impact of various fiscal and financial factors can be isolated and tracked over time.

This cost measure is then compared with the annual market rental cost of an exactly equivalent bundle of services that comes with a dwelling. In equilibrium, the expected cost of these services provided by these two competing modes of tenure (i.e., homeownership and private market renting) should be equal. Therefore, in equilibrium, the expected cost of owning a house should equal the cost of renting. As a result, the cost of renting can be equated to the user cost of homeownership as a household should be indifferent between owning and renting a dwelling with equivalent services. This framework can then be used to understand the cycles in Irish house prices over the period 1980 to the present.

In the Irish case, we find that, by falling in a cyclical upturn, the user cost adds to already high demand pressures in the market and by rising in a cyclical downturn, it subtracts from demand in the market which is already falling. It is, accordingly, a troubling source of dynamic instability and, as the recent record across countries shows, a threat to financial stability. We examine why the user cost behaves in such a highly pro-cyclical fashion and what policy could do to ensure a more efficient functioning of the housing market. In this context, the options for fiscal policy and financial instruments such as REITs in the management of the housing market are explored. In addition, we apply the user cost analysis to infer an estimate of the extent of any misalignment in the housing market. Our results corroborate evidence from other sources indicating that a substantial correction in house prices has taken place bringing prices back to levels consistent with or below long-run equilibrium values.

Understanding Irish house price movements – a user cost of capital approach

Frank Browne, Thomas Conefrey and Gerard Kennedy¹

Abstract

This paper employs the user cost of capital to examine Irish house price movements. The bundle of services afforded by a dwelling can be accessed either by renting the dwelling or by outright purchase. Between 2002 and 2007, a combination of factors including rapid house price appreciation and the prevailing fiscal and monetary environment created a strong bias towards homeownership. This was reflected in a negative user cost of housing as capital gains exceeded funding costs (both direct mortgage cost and the opportunity cost) thereby incentivising home ownership and fuelling further increases in prices. We find that the collapse in house prices since 2007 has contributed to a reversal of this process. From mid-2007 onwards, the user cost has soared as capital losses have greatly exceeded the funding costs (albeit falling) causing house prices to fall further. Both fiscal and financial policy measures which could enable a more efficient functioning of the housing market are discussed.

Keywords: house prices, user cost, bubbles, rents, equilibrium

JEL Codes: R3, R31, E62

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1. Introduction

As the Irish experience illustrates, developments in the housing market have the capacity to exert considerable influence on the macro-economy, the banking system and the labour market both during periods of housing market boom and bust. Policy intervention and, a fortiori, policy advice aimed at better managing the housing market cycle presupposes that a market failure can be identified. The first task is to identify where the market failure(s) in the housing market in Ireland, if any, lie, before outlining solutions aimed at correcting these failures.

This paper invokes the concept of the user cost of capital which is the outlay(s) that must be incurred to gain access to the services provided by housing via homeownership rather than via renting in the private market. All the cost outlays of home ownership, incurred each period² can be brought together in the user cost of capital in housing (i.e., UCCh). This variable can be measured from its constituent parts with varying degrees of detail. The approach adopted in this paper is to construct an estimate of the user cost from its detailed components. This has the advantage that the impact of various fiscal and financial factors can be isolated and tracked over time. The contribution of different factors can also vary across households. This is because some of the government taxes/subsidies brought in over time depend on the household type. To capture these tax effects, the user cost has to be calculated for a representative household.

This cost measure is then compared with the annual market rental cost of an exactly equivalent bundle of services that comes with a dwelling. In equilibrium, the expected cost of these services provided by competing modes of tenure (i.e., homeownership and private market renting) should be equal. Therefore, in equilibrium, the expected cost of owning a house should equal the cost of renting. As a result, the cost of renting can be equated to the user cost of homeownership as a household should be indifferent between owning and renting a dwelling with equivalent services. This framework can then be used to understand the cycles in Irish house prices over the period 1980 to the present.

² In this paper the annual costs associated with home ownership are examined for each quarter between 1980Q1 and 2012Q2.

In the Irish case, we find that by falling in a cyclical upturn, the user cost adds to already high demand pressures in the market and by rising in a cyclical downturn, it subtracts from demand in the market which is already falling. It is accordingly a troubling source of dynamic instability and, as the recent record across countries shows, a threat to financial stability. We examine why the user cost behaves in such a highly pro-cyclical fashion and what policy could do to ensure a more efficient functioning of the housing market. In this context, the options for fiscal policy and financial instruments such as REITs in the management of the housing market are explored.

There are many influences on the housing market which the user cost of capital approach does not, and cannot, take into account. It does not factor in supply constraints in the housing market which can play a big role in precipitating a speculative frenzy in the face of unanticipated positive demand shocks (see Browne and Kennedy (2010, 2012)). Planning and zoning rules would tend to restrict the amount of land available for building purposes, with the only outlet for demand pressures being an acceleration in prices.

The plan of the paper is the following. Section 2 presents a brief overview of the user cost literature. Section 3 is devoted to a detailed derivation of the user cost for the Irish housing market spanning a period from 1980 to 2012. All empirical user cost measures to date for Ireland have yielded substantial and persistent negative values for a sustained period from the late 1990s. A negative price poses a conceptual conundrum, an issue noted in this section and addressed in greater detail in Section 4, which discusses the estimates of the user cost for Ireland.

Section 5 examines how the equilibrium mode-of-tenure arbitrage condition can help in identifying house price misalignment, using our estimate of the user cost. Based on this arbitrage approach, the paper reports estimated equilibrium house prices which are plotted against actual house prices thereby helping to identify misalignments. In light of the results and discussion in the paper, the concluding section takes up the issues flagged in the introduction relating to market failure. The user cost, and the factors acting through the user cost, can throw light on where the market failure lies and how remedial policy measures might be brought to bear on the problem.

2. Literature review

The approach employed here uses the Jorgensen (1963, 1967) theory of the user cost of capital. Poterba (1984) was one of the first to apply it to the housing market. Some researchers see the user cost as playing only a limited role, for example as a way of encapsulating the after-tax cost of home ownership (see, for example, Capozza et al, 2002). Other researchers have stressed a key role for the user cost in understanding the workings of the housing market. The OECD has paid close attention to it in its cross-country study of the housing market (OECD, 2005). Its approach is similar to that adopted herein. However, we depart from its approach in a few respects, which are explained in greater detail in section 3. We go beyond the OECD approach in postulating a steady-state arbitrage equilibrium relationship between the two modes of tenure. The fundamental equilibrium user cost that falls out from this is not, unlike the actual user cost as derived in the OECD paper above, a function of capital gains and losses (since these are, by definition, zero in the steady state). Nor is it a function of the actual interest rate but rather the equilibrium interest rate. This allows us to derive a fundamental equilibrium house price. This can then be compared with actual house prices to identify periods of price misalignment.

Blackey and Follain (1995), note that models of the housing market assume a close relationship between rents and the user cost of capital for home ownership. However, these researchers fail to uncover any such close relationship in their empirical work. They estimate that the equilibrium adjustment process which is quite prolonged with only about one-third of the adjustment process achieved within ten years. They attribute the result to the greater volatility of the user cost series, which is also a feature of the Irish data. Their angle on the user cost is different to ours in that they are interested in the supply-side issue of the extent to which rents are driven by the real after-tax cost of capital used to produce housing for rent. Our perspective is the demand side rather than the supply side of the market, i.e., demand substitution between the two modes of tenure.

Diaz and Luengo-Prado (2008) employ the user cost approach to pinpoint a possible bias in the estimates of the cost of housing services if a rental equivalence approach is used. In a more recent paper by the same authors (Diaz and Luengo-Prado, 2012), they analyse the economic factors behind tenure choice. They identify preferential tax treatment and access

to collateralised credit as two of the main benefits of homeownership although these are tempered by the heavy transactions costs of house purchase

Some researchers have observed that mortgage market imperfections, giving rise to credit rationing in the market, can drive a wedge in the user cost – rent arbitrage relationship (see, for example, Meen (1990) and Kim (2008)). Though relevant in the current environment, it is unlikely that this was an issue, over the time span of greatest interest in our own empirical work, i.e., the boom period between the mid-1990s and 2007. During these years the mortgage market would have been more accurately characterised as having been in excess supply than excess demand.

Himmelberg et al (2005) employ the user cost approach because they deem it to be the correct way to infer whether the level of house prices is “too high” or “too low”. Their user cost differs from ours (developed below) in two main respects: firstly, their user cost formula is derived for a cash purchaser since they only consider the opportunity cost of the funds devoted to house purchase (what these funds may have earned if not used for this purpose) in which case they don’t need to consider the direct cost of a mortgage; secondly, they include a risk premium term to capture what they argue is the higher risk of owning relative to renting.

A number of papers have applied the concept of the user cost to the Irish housing market. Murphy (2005) pays a good deal of attention to the user cost of capital in his model of Irish house prices. Although the user cost is defined fairly conventionally in keeping with the literature, some complications such as the distinction between debt and equity funding, grants, taxes and subsidies are not addressed.³ Murphy incorporates a narrower definition of the UCCh variable in a house price equation where the UCCh is proxied by just a real own interest rate (i.e., the nominal mortgage rate less house price inflation). It is correctly signed (negative effect on house prices), significant but small.

Using a similar approach to that adopted in this paper, Barham (2004) calculates the UCCh for the period 1976-2003. The author uses the actual change in house prices as a proxy for house price expectations and includes a term for imputed rent in the user cost equation. For the majority of the period from 1976-2003, he reports a value for the user cost of housing

³ These variables are incorporated in the user cost calculations in this paper, (see section 3).

which is negative or close to zero. Barham identifies untaxed capital gain afforded to homeowners as the most significant influence on the UCCh over this period.

Browne (2004) discusses the UCCh in an Irish context focusing in particular on the impact of fiscal policy. He reports a negative estimate of the UCCh from the late 1990s onwards and notes the implication that the cost of holding the property for the homeowner is effectively negative when all taxes and subsidies are taken into account. Browne argues that changes in tax and subsidy provisions could, by interacting with house prices, act as a catalyst and precipitate a spiral in house prices.

Duffy (2011) calculates the user cost of housing for Ireland from 1999 to 2011. Using a version of the UCCh equation where the tax and subsidy components are aggregated, he finds that the user cost was negative for most of the period from 1999 until around 2008. As house price expectations become negative from 2009, the estimated UCCh turns positive.

The current paper updates and builds on the analysis in these earlier papers. We build up an estimate of the user cost from its detailed sub-components which allows the impact of various tax and monetary factors to be clearly identified. We extend the sample to cover the period of the house price bubble and the recent collapse and use our UCCh estimates to assess price misalignment in the housing market.

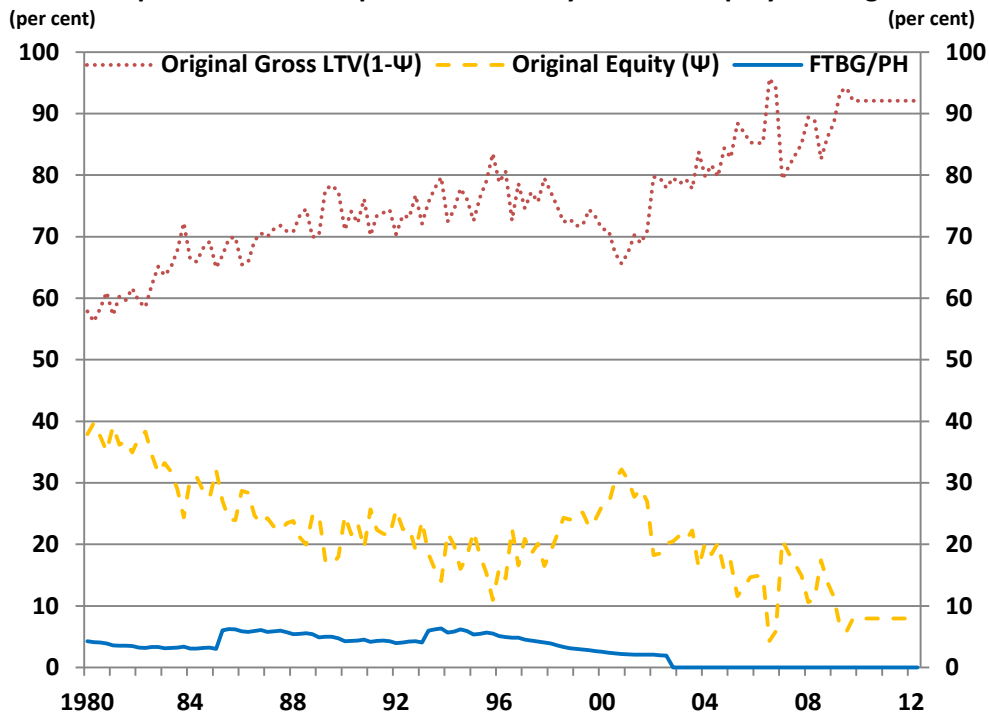
3. Methodology

The user cost concept takes into account a number of factors, other than just the direct and opportunity costs of house purchase, impacting the cost of the bundle of services conferred by homeownership. Primarily, these comprise of taxes and subsidies along with the expenses incurred for depreciation (D) and maintenance (M). Since some of the taxes/subsidies in force were directed at particular segments of the population, the user cost calculation has to be done for a representative household. This is assumed to be a married couple with two children who are first-time buyers.

Any realistic account of the user cost also has to factor in the distinction between the proportions of the total funding cost met by debt ($1 - \psi$) and by equity (ψ), mortgage borrowing and own funds respectively. The equity contribution is the value of the house at purchase (Ph) less the mortgage, less the once-off government grant that was available to

our representative household, a first-time buyer (i.e., $Ph(1 - LTV - FTBG)$. $FTBG$ is the first-time buyers' grant expressed as a fraction of the new house price. This grant was available from 1977Q2 until 2002Q3. LTV is the loan-to-value ratio for the average loan size. The way the first-time buyer's grant enters the formula below assumes that the entire grant is used to help to defray the cost of homeownership (see Chart A below).

Chart A: Proportions of house price costs met by debt and equity funding



The following accounting relationships are required to arrive at the real net user cost of capital in housing (i.e. Ph/CPI) as in equation (7) below):

$$Pg = \psi rd(1 - \pi)Ph + (1 - \psi)[rmPh - MS] - e(Ph) + D + M + T + SD \quad (1)$$

$$\psi = 1 - (LTV + FTBG) \quad (2)$$

$$D + M = 0.005Ph \quad (3)$$

$$SD = \eta Ph \quad (4)$$

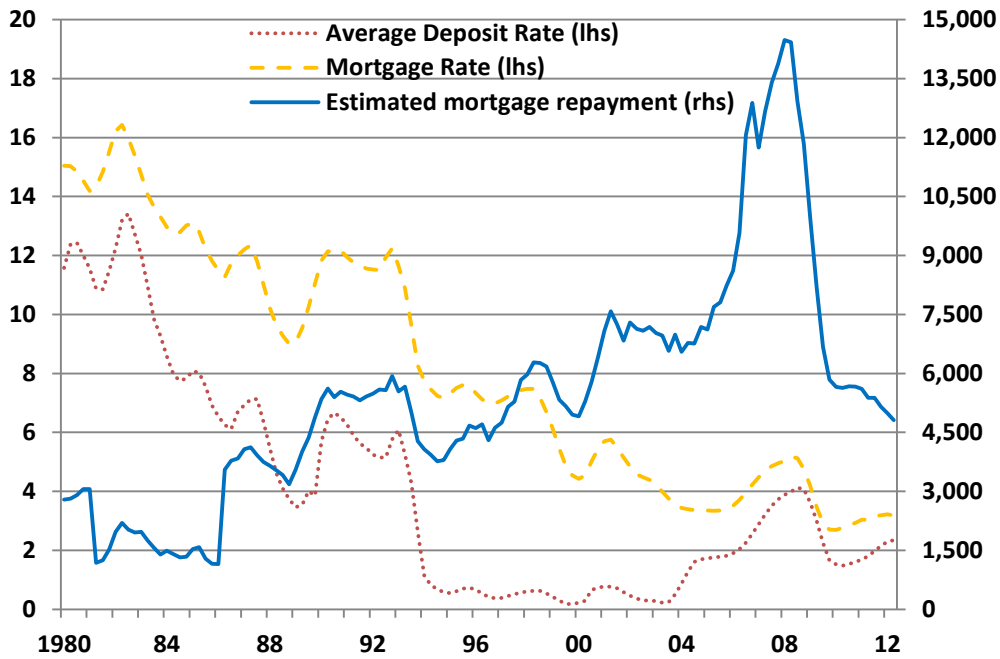
$$\delta = \{\alpha(1 - \psi)rmPh\tau^*\} \quad (5)$$

$$Pn = Pg - \delta \quad (6)$$

$$UCCh = Pn/CPI \quad (7)$$

The first term in the gross user cost of capital (P_g , equation (1)) is the purchaser's (representative household) opportunity cost of the own funds invested in the dwelling. Given the lack of diversity in Irish household portfolios for much of the sample period (1980 to 1995), partly due to capital controls, the only realistic alternative asset to housing was a domestic bank deposit. Therefore, the deposit rate of interest (i.e., r_d) is assumed to be the opportunity cost (Chart B). The gross opportunity cost is therefore this rate per period multiplied by the purchaser's own funds used in the acquisition of the house (i.e., $\psi r_d P_h$). The net opportunity cost is lower since part of interest income due has to be paid in DIRT (deposit interest rate withdrawal tax, i.e., π). The first term in equation (1) above is therefore the net equity opportunity cost of funding.

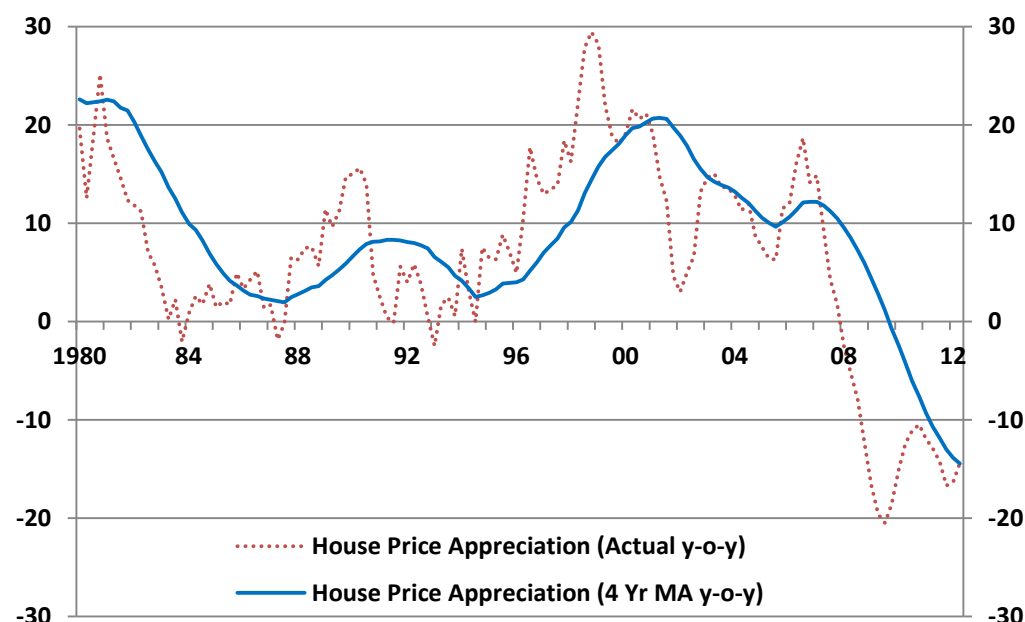
Chart B: Average deposit rate, mortgage rate and estimated mortgage repayment costs
(per cent) (€ euro)



The direct debt cost of funding is captured by the second term in P_g ($(1 - \psi)[rmPh - MS]$). This is mortgage interest repayments (see chart B). For a brief time during the period under review (1981Q3 to 1986 Q1), a mortgage subsidy was accrued to the representative household, MS is its discounted present value. The combined cost of depreciation (D) and maintenance (M) is assumed to be equal to half of one per cent of the value of the property per year, i.e., equation (3) above.

The ex-post rate of appreciation in the value of residential property is calculated as $e(Ph)$ and is a key element in the Jorgensen measure of the cost of capital. It enters negatively in equation (1) as it represents a benefit (reduced cost) to the owner. Since an individual's primary residence is exempt from capital gains tax, the full capital gains benefit accrues to the homeowner (i.e., the coefficient on $e(Ph)$ in equation (1) above is 1). However, behaviour in the housing market is driven by the ex-ante or expected, not the ex-post, capital gains. Given the wild swings to which house prices seem to be prone, this term will at times tend to dominate variation in the user cost.

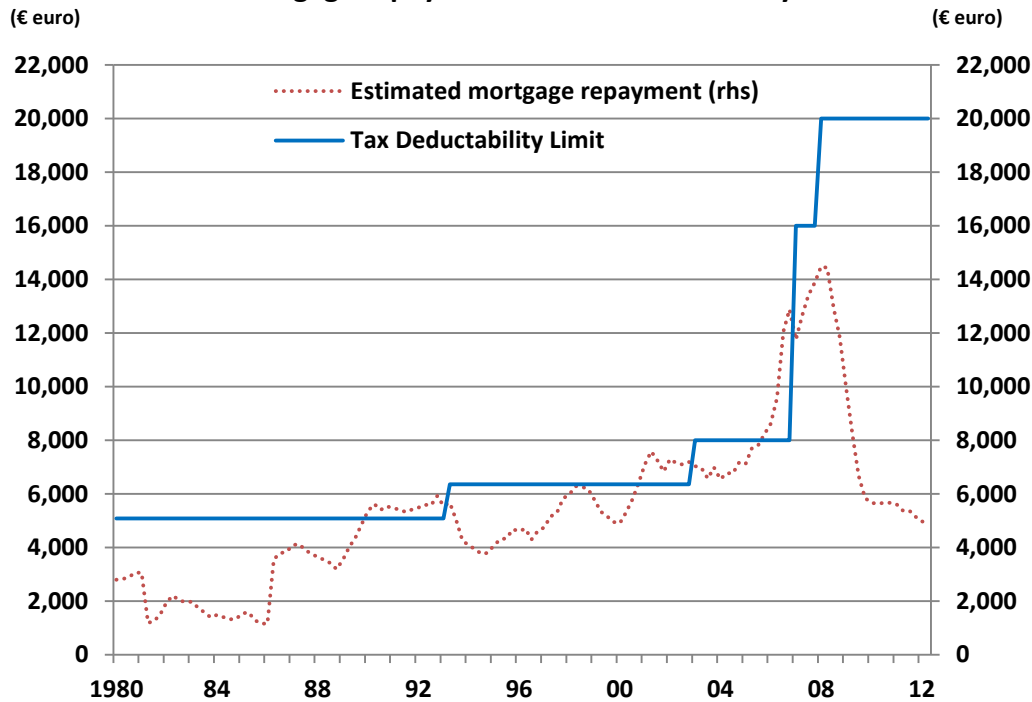
Chart C: Annual house price appreciation: actual vs. 4 year moving average
(per cent)



Whatever is assumed in respect of house price expectations is crucial because the apparent dynamic instability in the housing market seems to hang on this assumption to a large extent. A number of observers of the housing market in the US and elsewhere, attribute these wild swings to backward-looking expectations (see Malpezzi and Wachter (2004), Capozza et al (2002), Shiller (1990) and Wheaton (1999)). The same assumption is made here. Using a similar timeframe to Muellbauer (2012), the moving average of annual house price growth over the previous 4 years, or in this case 16 quarters, forms the basis of price expectations. Chart C presents two expectations regimes; one based on the 4 year moving

average and the other based on actual price changes. Our calculation of the user cost in the following sections uses the four-year moving average of house price change.⁴

Chart D: Annual mortgage repayments and tax deductibility limit



Until 2011, only second-hand properties were subject to stamp duty, which is payable on the market value of the property at the time of purchase (see equation (4) above). Stamp duty is a transactions tax. It has been subject to frequent and substantial changes over time, however as first-time buyers were exempt from stamp duty for the majority of the period under review, the only change which will affect our calculations was the one which made FTBs subject to a 1 per cent stamp duty from 2011. The item T in equation (1) relates to any property taxes to which the homeowner is liable. Again property taxes were not relevant for the majority of the period under review, and only come into consideration due to introduction of the household charge of €100 in 2011.⁵

The next step in the calculation of the user cost is to factor in the tax deductible portion of the mortgage interest rate payment, from taxable income. This suggests a distinction between the net and gross user costs (i.e., P_n and P_g respectively), reflected in equation (6)

⁴ For robustness, Appendix 2 calculates the UCCh using an alternative assumption of house price expectations.

⁵ Though a residential property tax was levied on houses over a certain value, from 1982 to 1996, the average house price in our series never reached the threshold where it would have applied. Details of a new property tax were introduced in Budget 2013 – payable from July 2013.

above. The first term in equation (5), (α) is a binding constraint on the amount of interest payable that is tax deductible. This is multiplied by the mortgage interest payments, $(1 - \psi)r_m P_h$, and τ which is the rate of mortgage interest relief rate of tax, (Chart D).

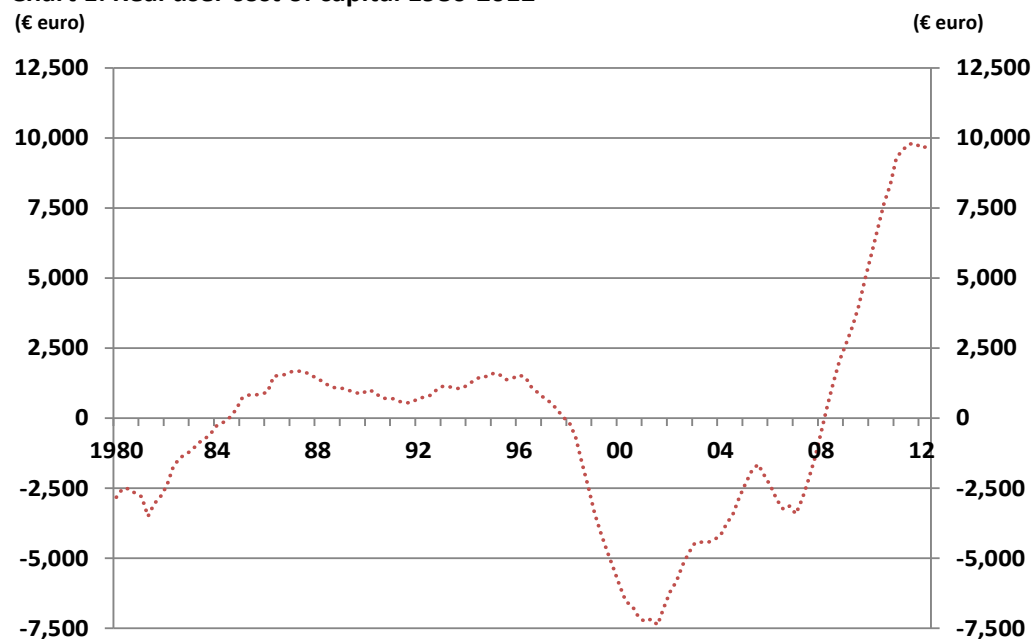
The net user cost (i.e., equation (6)) is the gross user cost less this tax break (δ) to the homeowner. The real net user cost is the net user cost deflated by the consumer price index (CPI), i.e., equation (7) above. It should also be borne in mind that this is implicitly a certainty-equivalent user cost. No attempt is made to adjust for risk or uncertainty, which may be an issue worthy of future research – (see Diaz-Serrano, 2004).

4. Results

4.1 Estimates of the UCCh 1980-2012

The previous section outlined the various components of the user cost of housing. In order to assess how all of these factors combined have influenced housing demand, it is necessary to analyse the aggregated effect in terms of the user cost of housing. Aggregating the components of equation (7), Chart E shows our estimate of the real user cost of capital for housing from 1980-2012Q1. The graph indicates that the user cost was marginally positive for a decade from the mid-1980s. The UCCh then turned sharply negative during the period of rapid growth in house price expectations, (as per the 4 year moving average of actual house prices) from the late 1990s until 2007.

Chart E: Real user cost of capital 1980-2012

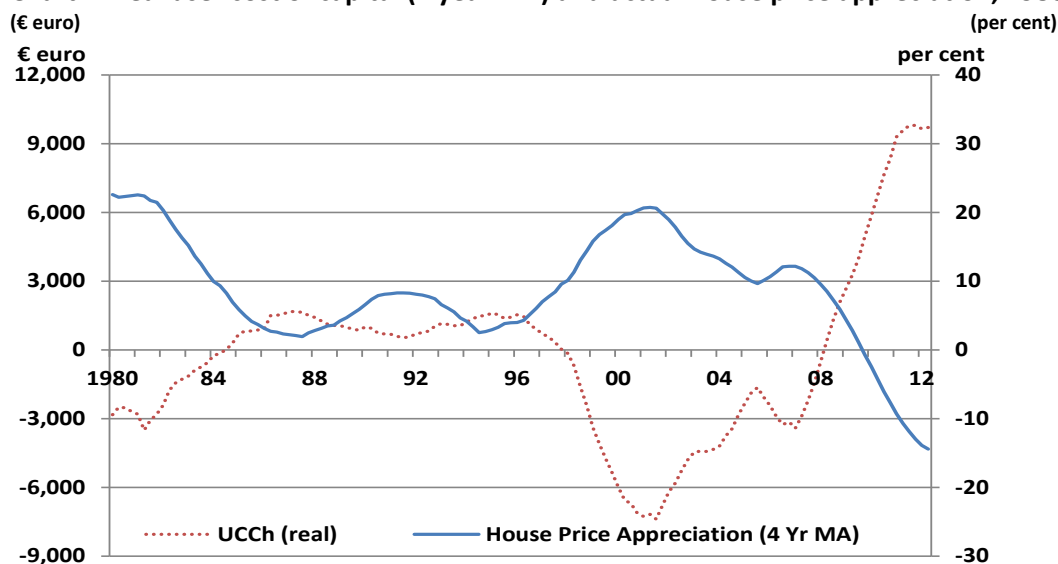


The inverse relationship between the UCCh and house price expectations is further illustrated in Chart F. Untaxed capital appreciation has been the key factor which has kept the estimated user cost negative for prolonged spells over the period from 1980 to 2012. For the most part, the sharp trend decline in the user cost of housing from about the late-1990s until 2008 coincides with a period of very strong growth in house prices. During this period capital appreciation exceeded the total funding costs of homeownership (i.e., the direct mortgage cost along with the opportunity cost and the other per period costs of homeownership) turning the user cost negative. This further shifted the balance in favour of home ownership.

The rate of house price appreciation slowed significantly during 2002 before accelerating again. Economic growth moderated due to a downturn in the world economy in the wake of the dotcom share price collapse. This had the effect of reducing demand for housing. Furthermore the introduction of anti-speculative measures arising from the implementation of proposals in Bacon and McCabe (2000) led to a cooling of the market. The proposed measures included: stamp duty at a new flat rate of 9 per cent on all property bought by investors and the proposal for an anti-speculative property tax of 2 per cent per year on property purchased. The introduction of many, but not all of these measures, resulted in a significant withdrawal of investors from the market and an easing of the rate of house price growth. However, following representation from investors, these measures were abolished

and instead fiscal measures were introduced which boosted the market and had the effect of increasing property prices. In particular, the government implemented changes which allowed mortgage interest on investment properties to be offset against rental income.

Chart F: Real user cost of capital (4 year MA) and actual house price appreciation, 1980-2012



The resumption of strong economic growth after 2002, as well as the effect of these fiscal policy measures which stimulated the property market, resulted in rapid increases in property prices from 2002 to 2005. The rate of price appreciation eased slightly in 2005 but accelerated again during 2006 to 2007 when the rate of appreciation peaked. The record rate of house price appreciation, as well as aspects of fiscal policy which favoured home ownership, resulted in persistently negative estimates of the user cost of capital for housing across this entire period.

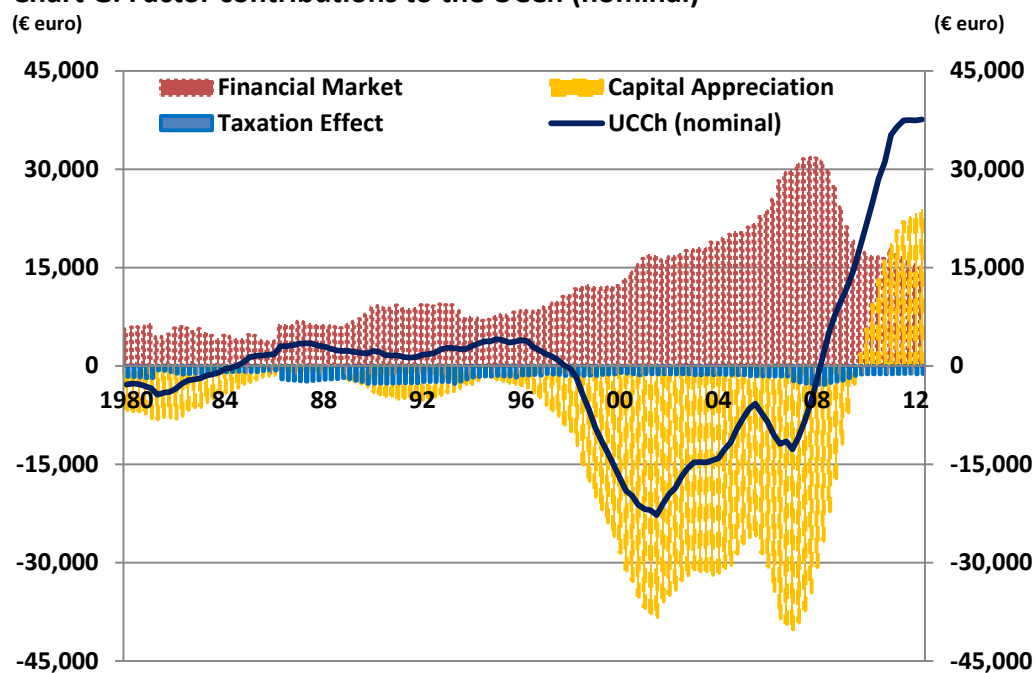
House prices peaked in late 2007 and then began to fall sharply as the economy slowed, the international financial crisis took root and the scale of the problems in the Irish banking system became apparent. The decline in house prices had a major impact on the estimated user cost of housing which, having been negative almost continuously since 1994, turned positive in mid-2008 as illustrated above in Charts E and F. The positive estimated values of the user cost from 2010 to the present indicate the amount that homeowners must pay to access homeownership. This represents a reversal of the pattern for the user cost which was evident over much of the period from 1980 where negative values for the user cost

predominated, implying a net payment accruing to households for accessing housing services.

Barham (2004) traces the development of various elements of the user cost framework in an effort to explain house prices movements. The author allocates the factors of the UCCh into three generic categories, the expected capital gains/losses effect, the interest rate/financial market effect and the direct taxation/subsidy effect. He shows that up to 2003, house price expectations were responsible for the majority of the variation over the past three decades.

In Figure G we decompose our (nominal) estimate of the user cost of capital in housing into the contributions of the three factors listed above. House price expectations have been a particularly influential and dynamic factor throughout the period under review. During the housing boom, a time when nominal house prices were growing by an average of 14 per cent per annum, the expectation of greater and greater capital appreciation drove the UCCh increasingly negative. Despite the housing downturn, the influence of this factor remains strong, although it is operating in reverse as the current negative house price expectations are the main cause of the higher UCCh.

Chart G: Factor contributions to the UCCh (nominal)



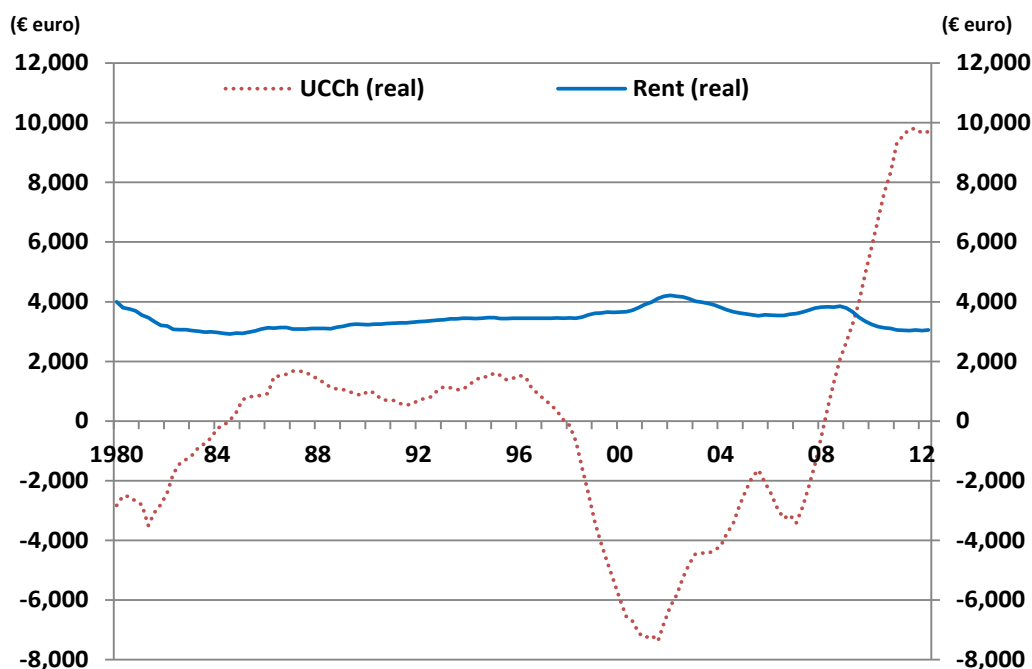
The relatively high interest rates of the 1980's and again in the early 1990's resulted in the financial market component being particularly influential on the UCCh in the early years of our sample, as mortgage rates exceeded 16 per cent in the former and 12 per cent in the latter. During the period of rapid house price growth from the beginning of the 2000s, the impact of this factor was also substantial as growing house prices and LTV's resulted in larger average mortgage repayments. However, the mitigating low interest rate environment which persisted from the start of EMU meant that the more pronounced interest rate effect was more than offset by the effect of rapidly increasing house price expectations since the latter is a key ingredient of the financial market component of Chart G.

The limited impact of taxation on the estimated user cost is clear in Figure G. The chart indicates that, rather than increasing the cost of home ownership, the taxation effect has been negative throughout the period from 1980. This is because the subsidies granted to home owners in the form of mortgage interest relief and other grants have exceeded the amount paid in property related taxes. This reflects the non-taxation of capital gains on principle private residences and the absence of a property tax for the majority of the period analysed. A property tax, which would have increased the user cost, was in place from 1983 until 1997 but householders with property valued at close to the national average were unlikely to have been liable for it. Compared to the mid-1980s, the negative taxation effect actually increased during the house price boom of the last decade implying an increase in the subsidy to home owners at a time of rapid house price growth. The recently announced changes in housing taxation policy have had little chance to influence developments so far.

4.2 Discussion

The estimates of the user cost of housing presented above raise a theoretical conundrum to be tackled. The UCCh is a price. However, calculations of the user cost for the Irish market gives consistently negative values for fairly prolonged spells of time (see Browne (2004), Barham (2004), Duffy (2011)). But the idea of a negative price prevailing in unconstrained private markets would seem to infringe a basic axiom of economics. It also suggests that, in equilibrium, private market rents should, according to our mode of tenure arbitrage story, also be negative which is never observed.

Chart H: UCCh (real) and estimated rent (real)



It would appear, prime facie, that there are serious conceptual issues relating to the UCC calculation. Let's consider what it is actually saying as currently calculated (see below). Let's take 2006Q3 as an example. This is saying that, as homeowner, he/she is being given 2,384 euro per annum to consume a given package of housing services (shelter, security, comfort, etc). In the private rental market, let's say the identical package of services costs approximately 3,500 euro per annum in real terms.⁶ So, in one case, where these identical services are accessed via the homeownership mode of tenure, the purchaser is being **granted** ca. €2,384 in order to access these services while, in the case of access via the rental mode of tenure, the purchaser is being **charged** ca. €3,500 to access the identical bundle of services. These differences were also sustained for prolonged periods of time, particularly throughout the period of the house price boom. This would seem to fly in the face of the no arbitrage tenet of finance.

However, this result may make sense in the context of Ireland, during this episode. The Irish housing market amounted to something of a pathological case. This huge difference in the cost of accessing identical services via two different routes (see Chart H) should have

⁶ It should be noted that, although rental payments were tax deductible for a period in the past, we do not adjust the rental series in Chart H to take account of this tax benefit. The overall impact of this measure is likely to have been small and confined to part of the sample.

generated enormous arbitrage pressure as people substituted in favour of the much cheaper homeownership route to access housing services. In principle, arbitrage should quickly close the cost gap. But it ostensibly did not – in fact, it widened the gap. There are a number of possible explanations for this including the following:

1. Firstly, in migrating from renting to homeownership, substitution led to neither a fall in rents (which remained buoyed up by strong demand and limited supply) nor a rise in interest rates (which should have happened, since substitution would have necessitated households leveraging themselves in the mortgage market, but did not because of the banks easy access to a relatively cheap and plentiful supply of international wholesale funding), either of which would have helped to close the arbitrage gap. It would, however, have tended to close in earlier periods before financial market liberalisation and monetary union, going back to periods before the 1980s. The bottom line is that there was no self-adjusting mechanism that would have allowed arbitrage to close the cost gap and drive up the UCCh to a level that would have brought an end to what proved to be an unsustainable boom more quickly.
2. More generally, two of the key influences on the user cost are (expected) house price inflation and the interest rate (or the two rates in our case). Low values for these nominal interest rates relative to expected house price inflation yield big negative values for P_g . But if financial markets are working efficiently, nominal interest rates should compensate lenders for the prospective erosion in the purchasing power over the duration of the loan. Over the period of the house price boom, they clearly were not working efficiently in this sense.
3. The failure of the nominal interest rates on Irish bank deposits and loans to reflect domestic inflationary pressures or to incorporate inflation volatility premia meant that they were (far) too low both in the lead up to monetary union and indeed within monetary union. This meant that the corresponding real interest rates were, in the prevailing context of positive inflation, a fortiori, also (far) too low.
4. There is another possibility in accounting for the negative values for the UCCh. The calculation is, in principle, only for homeowners and not for investors. A UCCh calculation for investors does not make sense. The investor, unlike the homeowner,

is not attempting to access and consume the services supplied by housing. This suggests that we may have two separate groups of agents and that the UCCh calculation mistakenly concatenates both. Let's say, in the extreme case, that these comprise homeowners, whose only interest (we assume) is in consuming housing services on the one hand (i.e., the consumption aspect of housing), and investors who are only interested in the yield on housing as an asset relative to that on other assets (i.e., the investment aspect of housing). It could be, therefore, that the former drives all the elements in the UCCh, except the expected capital gains element, which is driven exclusively by buy-to-let investors. Therefore, the speculative demand effect of the former, which the UCCh is trying to capture, may be lower than that for buy-to-let speculators. Using the moving average of actual house price changes to capture homeowners' expected capital gains may be an overstatement and may be biasing the measured UCCh on the downside.

5. The calculations here do not take account of other costs, such as the risk of homeownership or transaction costs such as agent/solicitor fees incurred with house purchase. The inclusion of these costs would increase the UCCh but would not materially alter the estimates in this paper.

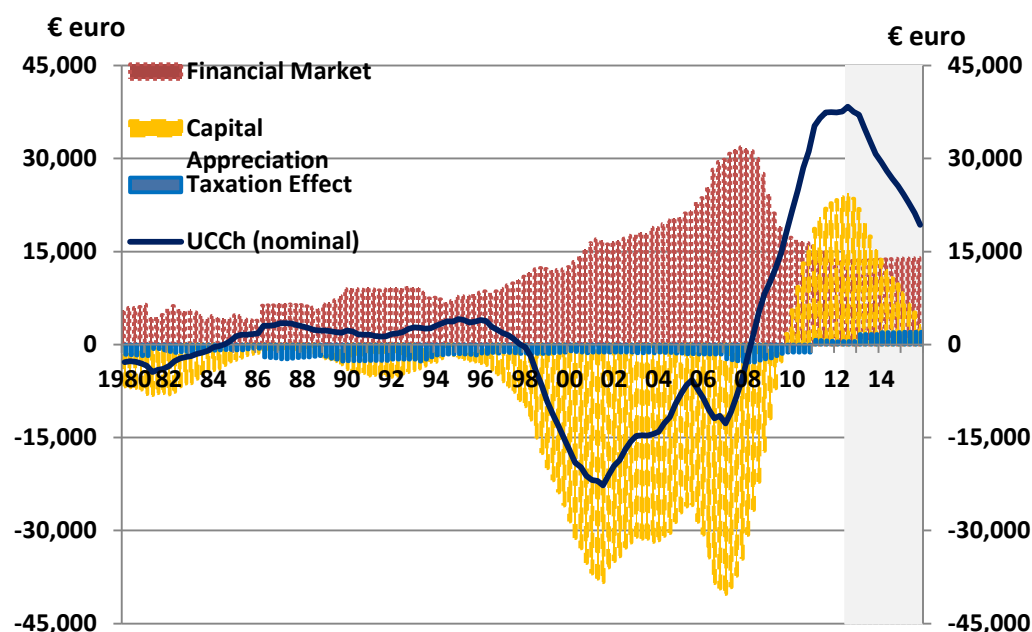
It is clear that the user cost has been reduced by a steep decline in both nominal and real interest rates as well as by the strong rate of house price appreciation. In fact, the actions of households and individuals, driven by this arbitrage opportunity may, in the context of monetary union, financial market liberalisation, an unprecedented wave of financial innovation in the mortgage market and supply constraints, have worked to widen, rather than narrow, the arbitrage gap.

4.3 Impact of recent fiscal policy changes on future path of UCCh

As part of the package of fiscal consolidation measures introduced since 2008, there have been a number of changes to the tax and subsidy treatment of the housing market. Stamp duty is payable by first time buyers since the beginning of 2011, a household charge of €100 was introduced in 2012 and will be replaced this year by a property tax of 0.18 per cent of the value of the house

(homeowners will pay half the annual amount in 2013).⁷ Tax relief on mortgage interest payments was phased out on 31st December 2012.⁸ To illustrate the impact of these policy changes over the coming years, we calculate an estimate of the user cost of housing out to 2015.

Chart I: Estimated future path of (nominal) UCCh



For the tax and subsidy components of the UCCh calculation, we implement the policy changes as announced in recent budgets. This means that our estimate of the user cost takes into account the removal of mortgage interest relief and the introduction of the property tax. We make a number of assumptions regarding the other components of the user cost. The mortgage interest rate and deposit rate, rates of depreciation and maintenance are held constant at their Q2 2012 levels. For house price expectations, we use internal CBI estimates based on the results of a recent survey of property price expectations.⁹

Chart I shows the decomposition of the estimated user cost out to 2015 based on the assumptions above. Reflecting the assumed easing in the rate of house price decline, the estimated user cost declines over the period to 2015. By the end of the period the estimated user cost of housing is close to the level of nominal rents. The blue bars in the chart show the contribution of taxation to the

⁷ FTBs are exempt from the new local property charge on new (unoccupied) and second-hand properties for 2013 and on new (unoccupied) properties until 2016. We assume the exemption applies for 2013 only. The 0.18 per cent tax is on the mid-point of €50,000 bands into which the value of the property falls.

⁸ A mortgage taken out from 1st January 2004 to 31st December 2012, used to purchase, repair, develop or improve the main residence is eligible for mortgage interest relief until 31st December 2017. Mortgages taken out after 31st December 2012 will not qualify for mortgage interest relief.

⁹ Auctioneers, estate agents and economists were surveyed by the CBI as part of this exercise.

estimated UCCh. Having been negative over the entire period from 1980 up to 2011 (implying a net subsidy thereby reducing the user cost), the taxation contribution turns positive from 2012. This reflects the impact of the removal of mortgage interest tax relief (subsidy) and the introduction of the property tax.

5. Indicators of house price misalignment

There are a number of approaches to assessing the degree of price misalignment (either over or under-valuation) in the property market. One approach is to use econometric models to compute the “fundamental” price as determined by supply and demand factors such as real disposable income, real interest rates, demographics and the housing stock. Using a suite of these models, Kennedy and McQuinn (2012) assess whether the fall in house prices is in line with that suggested by current fundamental factors within the Irish economy. Most of the models suggest that Irish house prices have over-corrected by up to 12 to 25 per cent.

The fundamentals-based house price models offer valuable insights into the state of the property market. However, there are also a number of drawbacks associated with relying on a model based approach to assess the extent of over or under-valuation. The estimated relationship between house prices and factors such as interest rates and income may be unstable over time because the prices elasticities of supply and demand can vary considerably over time. In addition, structural change in the economy may be difficult to capture in these models. Moreover, there is the danger of including endogenous variables as supposed exogenous determinants of house prices.

As a result of these disadvantages, it is useful to complement the evidence from econometric models with other approaches. In this context, evidence from affordability indicators and asset-pricing approaches offers useful insights and are examined here.

5.1 Price Income Ratio

One measure used to assess housing market conditions is the price to income ratio. This provides a gauge of whether or not housing is within reach of the average buyer. An increase in this ratio above its long-run average could indicate that house prices are overvalued.

Chart J: Ratio of house price to per capita disposable income

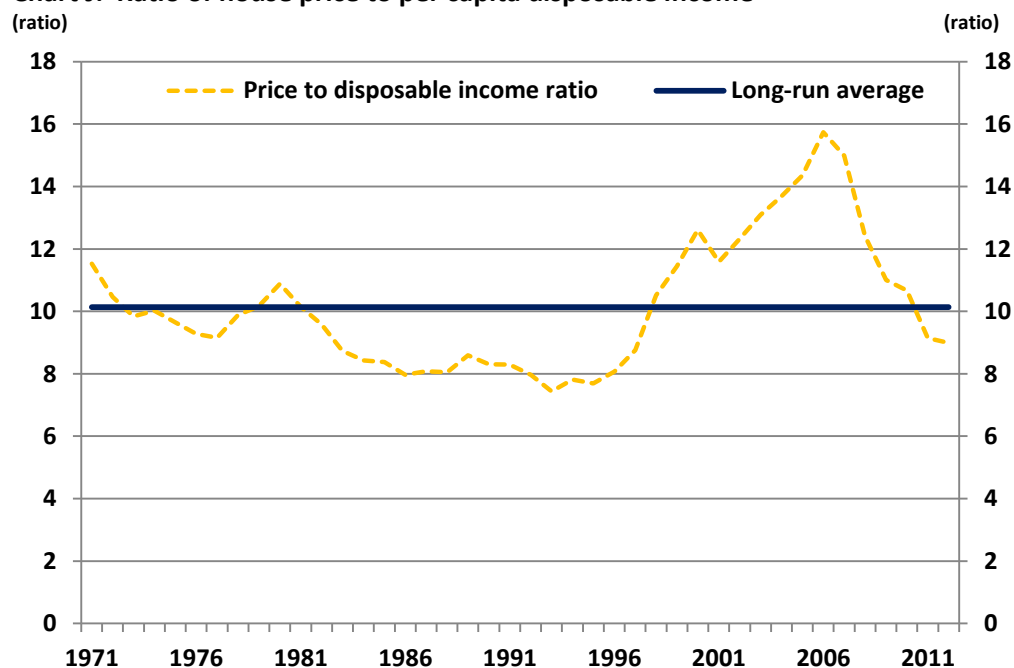


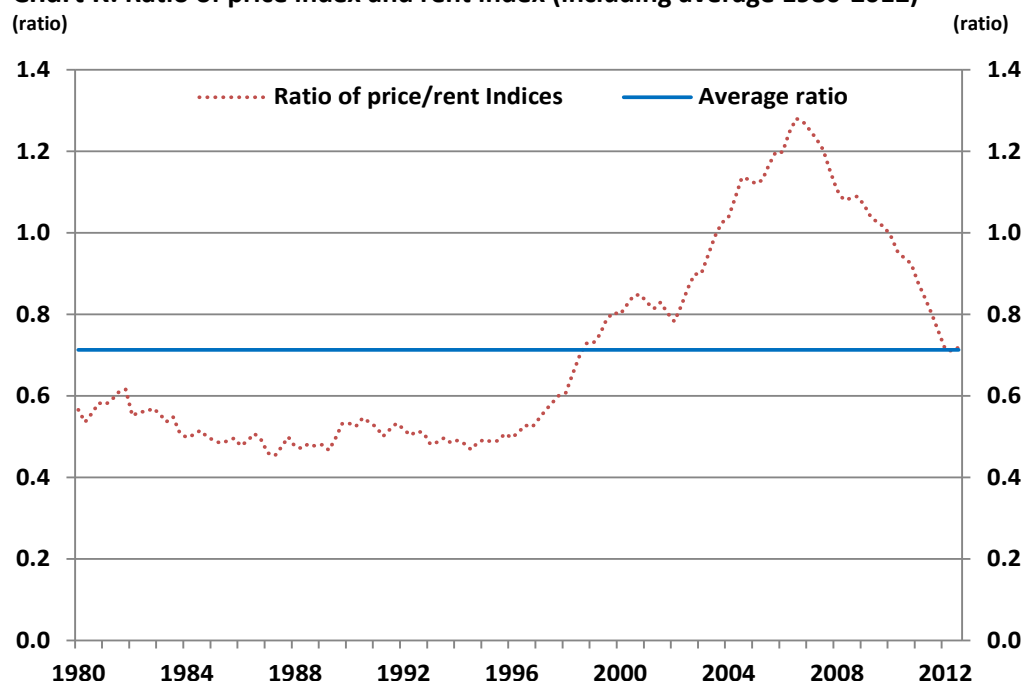
Chart J shows the ratio of nominal house prices to per capita disposable income from 1971 to 2012. The chart shows that the ratio was below its long-run average for an extended period from 1980 up to the late 1990s. It then exceeded its long-run average for more than a decade reaching a peak in 2006 but has declined sharply in recent years and currently stands at 12 per cent below its average historical long-run average. This is indicative of undervaluation in the property market consistent with the results using the econometric approach noted above.

5.2 Price-to-rent ratio

Another method of assessing house prices relative to underlying determinants to obtain an indication of over or undervaluation is to calculate the price to rent ratio, i.e. the nominal house price index divided by the rent component of the CPI. This measure is similar to a price-to-dividend ratio in the stock market and could be interpreted as the cost of owning versus renting a house. Chart K shows the price-to-rent ratio for Ireland from 1980 to the present. According to this measure, house prices became overvalued in the early 2000 with

the degree of overvaluation peaking in late 2007. Since the collapse of the property bubble, the ratio has been falling and currently lies close to its long-run average value.¹⁰

Chart K: Ratio of price index and rent index (including average 1980-2012)



5.3 User cost and price mis-alignment

As with the house price to disposable income ratio, the price to rent ratio provides useful insights but should not be looked at in isolation. The evidence from these measures on the degree of over or under-valuation can be complemented by also examining the evolution of the user cost of housing. In order to be able to infer an estimate of the extent of any misalignment in the housing market from the user cost calculated here, we note the following:

1. In equilibrium, the user cost of homeownership should be equal to the market rent for an identical bundle of housing services (i.e., $UCCh = R$). When all factors are taken into account, arbitrage ensures that the cost of accessing this identical bundle of services, whether by renting or by buying, is the same in equilibrium.
2. We make the robust assumption that market rents cannot be subject to a bubble. A tenant is only interested in the services (shelter, security, privacy and comfort, etc.,) which he/she derives from the dwelling and is entirely disinterested in the current or

¹⁰ Bermingham and O'Reilly (forthcoming) find that current house prices are close to equilibrium based on the rental price ratio.

prospective market value of the dwelling. The variable rents (R in the above equation) is, therefore, unequivocally a fundamental equilibrium variable. This means, axiomatically, that the value of UCCh which equals R is also a fundamental equilibrium variable which we denote by UCCh**.

3. Thirdly, we know, in a simplified version of the user cost, that:

$$UCCh = Ph(r + m + d + t + sd - e(Ph))$$

has therefore to become:

$$UCCh^{**} = Ph^{**}(r^{*} + m + d)$$

in equilibrium, where Ph^{**} is the fundamental equilibrium house price. This is because, in equilibrium, house prices are static by definition and house price inflation is zero (i.e., $\Delta Ph/Ph = 0$).¹¹ Furthermore, if the actual rate of interest were below the equilibrium (or natural) rate then there is an incentive to borrow and purchase more houses putting upward pressure on house prices (and vice versa). To ensure that the equilibrium implies no change, the actual has to be equal to the equilibrium interest rate (r^{*}). Solving the last expression for fundamental equilibrium house prices, and substituting rents for the fundamental equilibrium user cost, we obtain (noting that m and d are the rates as a percentage of house prices for maintenance and depreciation):

$$Ph^{**} = R/(r^{*} + m + d)$$

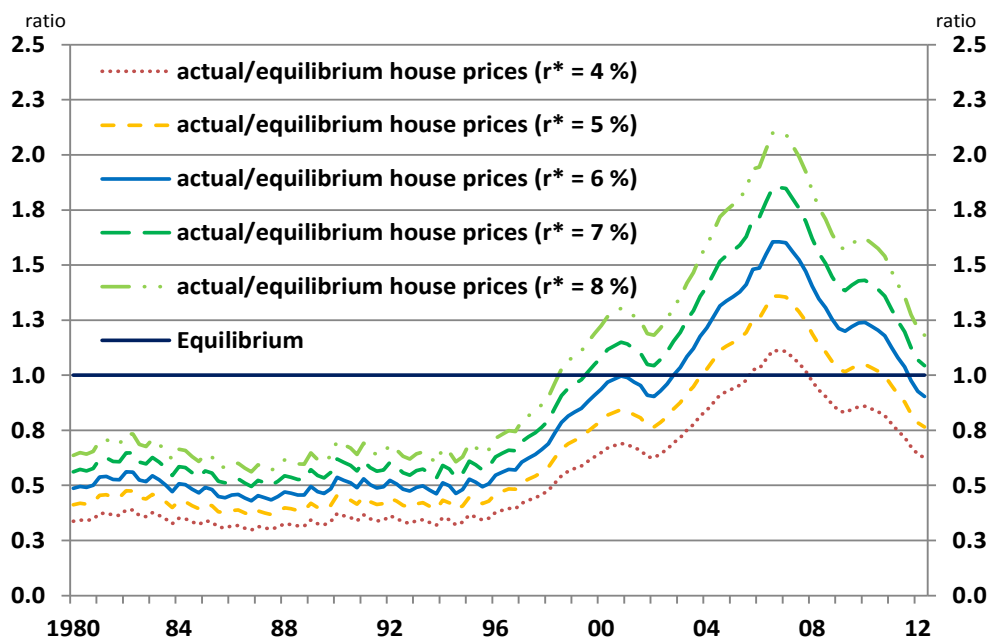
The fundamental equilibrium house price then moves with rents adjusted for the equilibrium nominal interest rate and the rates for maintenance and depreciation. To illustrate, a monthly rental income of €1,500 (for say a suburban semi-detached house) with a nominal equilibrium mortgage interest rate of 6 per cent and a combined half of one per cent for annual maintenance and depreciation, would give a fundamental house value of $18,000/0.065$, or €276,923. Stated alternatively, in this scenario, households should be willing to pay approximately 15 times the market rent to purchase the house.

Given uncertainty regarding what the equilibrium rate of interest is for Ireland, we calculate estimates of the fundamental equilibrium price based on a range of estimates of the

¹¹ For exposition, here we make the assumption that house price growth in equilibrium is zero; an alternative scenario exists where equilibrium house prices grow at a non-zero constant rate.

equilibrium interest rate. The results are presented in Chart L. Using this asset pricing approach, all models indicate undervaluation in house prices up to the late 1990s. The exercise suggests that prices became overvalued from the early years of the last decade with the extent of overvaluation reaching its peak in late 2007. In line with the other indicators of price misalignment presented above, the results indicate that there has been a large correction in house prices since 2008. Across all scenarios, the results suggest that house prices are close to or below the equilibrium values derived by the asset pricing model.

Chart L: Ratio of actual house prices and asset-pricing model house price



6. Conclusions and policy implications

A salient feature of the user cost of housing calculated in this paper is that, under a variety of plausible assumptions about the many inputs into its calculation (own and opportunity cost of funding house purchase, debt/equity choice, taxes, subsidies, maintenance and depreciation and, most importantly of all, capital gains/losses), the results show the UCCh has been below the market rent for almost all observations since 1980. From the late 1990s until 2008, the estimated UCCh was negative. The exception is the period following the start of the house price collapse in 2008 after which the user cost soared into positive territory. This provided the backdrop to the booming housing market effectively coinciding with this same period.

Housing markets in general, including the Irish housing market based on the analysis in this paper, seem to be in a state of dynamic instability much of the time. This instability is reflected in developments in the user cost of capital in housing. In boom times, the cost of homeownership (as measured by the user cost calculated herein) has tended to fall short of the cost of renting and by substantial margins. To avail of this attractive arbitrage opportunity, more dwellings are bought driving house prices up further (given another stylised fact of the housing market – namely, short-to-medium term inelastic supply). This, in turn, drove down the user cost via the capital gains effect dominating the interest rate effect (both direct and opportunity cost rates of interest) while leaving the cost of renting largely unaffected. The arbitrage gap between the cost of purchasing and renting to gain access to the same bundle of services was driven even wider. The initial bubble (discrepancy between rents and user cost) begot an even bigger bubble.

What makes a property price bust so wrenching is that this dynamic disequilibrium begins to operate with a vengeance when it goes into reverse when prices begin to fall. Our results show that from 2009, user costs begin to exceed market rents causing the demand for housing and house prices to fall sharply adding to the cost of homeownership, triggering downward dynamic instability. This was exacerbated in the Irish case by the surprising speed at which house prices fell. There are huge potential and actual externalities from this instability, not least of which is the threat to the health and viability of the banking system. It is therefore essential to identify what the market failure, or market failures, at work is. Are there policy measures that might be taken to mitigate these adverse externalities?

The area where there is the greatest room for manoeuvre by policy relates to taxation. In the context of Ireland's membership of EMU, Fitz Gerald (2001) argued that fiscal policy could play an enhanced role in the management of the housing market. The dominant role played by (expected) capital gains in the unstable dynamic which characterised the housing market during the boom period (as reflected in the generic factor contributions) points to the non-taxation of capital gains on the main dwelling and the reduction in capital gains tax on buy-to-let properties (from 40 per cent to 20 per cent in 1998)¹² as being a significant

¹² CGT has changed a number of times since 1998. Between October 2008 and April 2009, the rate stood at 22 per cent. It was increased to 25 per cent in the April 2009 supplementary budget and increased again in December 2011 to 30 per cent.

factor in unleashing what proved to be a very dangerous dynamic. The ability of homeowners to enjoy all of the capital gains on the main dwelling and of investors to avail of an increasing fraction of the capital gains on buy-to-let properties undoubtedly added to the demand pressures in the market and contributed to the house price spiral.

Given the exceptionally depressed state of the housing market at the time of writing (March 2013), any further tampering with the rate of CGT now would probably be unwise. However, if and when property prices recover to equilibrium values again there may be a case to be made for the *rate* of CGT to be indexed directly to the rate of capital appreciation. Depending on the rate of indexation, this could be a powerful measure for managing the housing market cycle, particularly in circumstances where the more conventional interest rate policy is no longer available. Other significant tax breaks, such as mortgage interest payment deductibility for tax purposes would also seem to have been a factor driving demand during the boom period.

One of the main influences on house prices, and the attendant failure of arbitrage to act as a stabilising influence, have been wild swings in output on the supply side of the market. Short-run inelastic supply contributed to the speculative frenzy during the boom period while long-run elastic supply has thrown up high levels of inventories and collapsing prices. This suggests that policymakers should seek to encourage the construction industry to find ways to smooth out the wild pendulum swings in production. Some policy measure that would render the industry less non-traded (via, e.g., strategic alliances with international building firms) and would allow a more elastic output response in the face of demand surges would help to obviate speculative frenzies.

During the boom period, when incomes and savings were increasing, there was an almost complete absence of any real or financial instruments which would have compensated savers even remotely for the time value of money much less for their anticipated erosion of purchasing power, with the one exception of housing. This suggests that policymakers should seek to help savers gain access to warranted yields on their investments thereby obviating the need to have recourse to highly speculative investments.

A kind of stock market for property (REITs) would greatly enhance the working of the property market. It would allow investors to get exposure to this asset class without any

leverage or much lower levels of leverage than is currently required. This would allow savers to expand the portfolio options open to them allowing them to optimise the risk/return trade-off on their overall asset portfolio. It would also encourage more widespread participation in the market so that profits (losses) incurred from a property price increase (reduction) would be shared across a large number of agents, each incurring only relatively small profits (losses) rather than a few banks incurring huge profits or insolvency-inducing losses.

Part of the reason we witness unstable dynamics in the property market is because the entities supplying the funding (ultimately depositors) are sheltered from the risk of the property in which the funds are invested. This would clearly not be the case with REITs. With secondary market trading in REITs, investors could go short in REITs which might help to obviate a bubble emerging in the underlying property market. REITs were mentioned in the Programme for Government and are provided for in the Finance Bill.

Finally, the paper presents a number of asset pricing and affordability indicators aimed at providing some insight into the extent of over or under-valuation in the property market. Although none of these indicators can provide a definitive estimate of the extent of price misalignment, they suggest that house prices are back to or below levels consistent with long-run equilibrium values of the price to rent and price to disposable income ratios. At the same time, the estimated user cost has turned sharply positive and currently exceeds market rents providing a disincentive to homeownership. Taken together, these results corroborate the existing evidence from econometric models (Kennedy and McQuinn, 2012) indicating the possibility that house prices may have overcorrected. However, these equilibrium house price estimates are sensitive to one's views as to what is the equilibrium nominal rate of interest. Were a recovery in prices to materialise in the coming years, it could make mortgage loan resolution schemes based on shared price appreciation more attractive to both distressed borrowers and to the lending banks.

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Appendix 1: Data Annex

In this section, additional details of the data¹³ used to estimate the user cost of capital for housing are provided.

Interest rates

Two interest rates are included, a deposit rate and a mortgage rate. Both series are sourced from the Central Bank of Ireland's credit, money and banking statistics table B.2.1¹⁴, the former is the interest rate on household deposits with agreed maturity while the latter is a floating rate for house purchases.

House prices

Unfortunately there is no single house price index which covers the period under investigation, so it is necessary to combine three indices to generate our house price series. Between 1996 and 2010 permanent TSB/ESRI produced a hedonic house price which included an average national house price figure. Before this the Department of Environment, Community and Local Government (DoECLG), put together an average house price series which began in the mid-1970's and continues to date, though with a substantial lag. The CSO introduced their hedonic residential property price index in 2011, which coincided with the end of the PTSB/ESRI series and included data back to 2005. For the purpose of this paper, house values between 1996 and 2004 are from the PTSB/ESRI national average house price series, these are adjusted by annual change in the DoECLG series between 1980 and 1994 and by the annual change in the CSO series from 2005 onwards. One drawback of this approach is that these indices are based on homes which were secured with a mortgage and while that may not have been a major factor for most of the period under review there is a suggestion that non-mortgage transactions have become much more prevalent in recent years.

Loan-to-value ratio

Department of Environment (DoECLG) data is also required to breakdown the average house purchase price between the part that was borrowed (debt) and the portion coming from the buyer's own funds (equity). Details of the number and value of mortgage approvals since 1980 are provided by the department and are used as a proxy for loan drawdowns. From this one can calculate the value of an "average mortgage" throughout the period, (total value of mortgage approvals/number of mortgage approvals). The average loan to value (LTV) figure for a particular period is found by comparing the value of the average mortgage to the average house price.¹⁵ The equity portion is the difference between the house price and the average mortgage.

Fiscal data

The rates and thresholds of the fiscal parameters used, such as the first time buyer's grant, mortgage subsidy, mortgage interest tax relief, stamp duty, deposit interest rate tax, income tax rates and property tax, before 2004 are sourced from Barham (2004). Recent changes in DIRT, mortgage interest rate relief, stamp duty income tax bands and the household charge/property tax

¹³ All data are quarterly

¹⁴ See Table B.2.1 Retail Interest Rates and Volumes - Loans and Deposits, New Business. Data are the average of monthly rates for the previous 12 months.

¹⁵ Because of a lack of data, this figure has been held constant at 92 per cent since 2010.

have also been taken into account for using a copy of the relevant budget announcement or data from the department of finance and/or the website of the revenue commissioners.

Appendix 2: Sensitivity analysis

Section 3 discussed the importance of the expected capital appreciation term in the calculation of the user cost. Based on the evidence from previous research for the US and the UK, the estimates of the user cost of capital presented in section 4 used the four year moving average of the annual change in house prices as a proxy for house price expectations. As this expectations regime implies that house price changes have a long memory, for robustness, here we calculate the user cost using the actual annual change in house prices as a proxy for house price expectations. The actual (year-on-year change and the four year moving average change in house prices are both plotted in Chart C above.

Chart A2.1 shows the estimates of the user cost of capital in housing using two alternative assumptions on house price expectations. The estimated user cost using the year-on-year change in house prices displays more volatility that the estimate of UCCh using the alternative house price assumption. This reflects the smoothing impact of taking the longer four year moving average change in house prices versus the greater degree of volatility in annual changes. Nevertheless, the chart illustrates that the broad trends in the UCCh are similar under both assumptions. In particular, using both assumptions, the user cost is negative for long periods from the late 1990s until late 2007 and then turns sharply positive over the observations covering the most recent period.

Using the year-on-year change in house prices as the expectation regime, the user cost peaks in late 2009 and then declines sharply. When the four-year moving average change in house prices is used, the UCCh soars after 2009 and remains elevated by then end of the period. In the latter, negative house price changes over the previous four years are projected into the future which keeps the overall UCCh elevated. In contrast, when the year-on-year change in house prices is used, the easing in the rate of house price decline which took place over the course of 2011 is fully captured resulting in a lower negative value for the house price appreciation term and hence, the user cost falls.

Chart A2.1: Sensitivity of UCCh to alternative house price expectations assumptions

