

The Effects of Taxation Policy on the Cost of Capital in Housing – A Historical Profile (1976 to 2003)

by Gordon Barham¹

ABSTRACT

Property has unique characteristics; it represents both a financial asset, providing the holder with a potential dividend stream in the form of rents, and a durable good, providing shelter for its residents. Governments have typically favoured home ownership and over time public policy has come to reflect this position via a number of different fiscal incentives aimed at promoting the affordability of housing. The discussion on the housing market has tended to focus on the initial cost, i.e., the purchase price. There has been little or no consideration paid to the benefits and costs associated with housing after the initial purchase. This article addresses to what extent changes in taxes and subsidies might explain the recent increase in house prices. In order to examine the combined costs associated with owner-occupancy we calculate an *ex-post* user cost of housing. The combination of beneficial fiscal incentives and declining costs, in terms of falling interest rates, have driven down the costs associated with owner-occupancy. The most significant factor has been the untaxed capital gain afforded homeowners, which for a majority of the period 1976-2003, has meant the user cost of housing has been negative. This may in part help to explain the reason for the growth in house prices.

1. Introduction

The 1990s was a decade of historically high rates of economic growth in Ireland. Accompanying this trend has been a dramatic growth in the price of property, which has seen house prices appreciate at an average rate of over 10 per cent per annum. Residential housing plays an important role in the economy. In the majority of cases the purchase of a house represents the most significant financial investment an individual faces over their lifetime. As such an increase in housing wealth can contribute to economic growth via increased consumer spending, arising through equity withdrawal or through a reduced savings rate. In addition to the effect on consumption, housing may also add to the economy through stimulation of the construction industry². Property also acts as a channel through which monetary policy affects the real economy, via the mortgage market. Property has unique characteristics; it represents both a financial asset, providing the holder with a potential dividend stream in the form of rents, and a durable good, providing shelter for its residents. Governments have typically favoured home ownership and over time public policy has come to reflect this position via a number of different fiscal incentives aimed at promoting the affordability of housing.

The discussion on the housing market has tended to focus on the initial cost i.e., the purchase price. There has been little or no consideration paid to the benefits and costs associated with housing after the initial purchase. Apart from the mortgage rate there are a

number of measures, mainly fiscal, that must be accounted for when examining the costs of owner-occupancy. This article addresses to what extent changes in these measures might explain the recent increase in house prices. A user cost of capital framework is employed in order to give a concise view on how these measures may have contributed to housing demand. Previous works examining the Irish housing market, such as Duffy (2002) and Roche (1999, 2003), have used similar measures in their analysis.

This paper is organised as follows – Section 2 outlines the user cost of capital in housing framework. It specifies the representative household used in the analysis. Section 3 outlines the costs associated with owner-occupancy, charting to what degree these have varied overtime. Section 4 focuses on the potential benefits accruing to homeowners. These benefits, primarily, take the form of fiscal incentives but also include favourable interactions of the tax system with other economic variables, such as inflation. Section 5 details to what extent the aforementioned variables may have contributed to the demand for housing in the combined user cost of housing. Finally, Section 6 explores the contribution of the various measures in explaining the variation of the user cost of capital framework.

2. The User Cost of Housing

The housing market is subject to a number of different policy measures designed to promote the affordability of housing. In addition, most homebuyers require some

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² As noted in the ECB (2003) the residential construction industry accounted for 8.2 per cent of GDP in 2001, compared with an average of 5.5 per cent in the EU.

form of leverage, in the form of mortgage credit, which may leave homeowners exposed to changes in interest rates. While it can be argued that changes in these variables may have contributed to housing demand individually, what is more important is how the interaction of these factors may have influenced the homebuyers' decision-making process.

In order to examine the combined costs associated with owner-occupancy we calculate an *ex-post* user cost of housing as proposed by Poterba (1984), in which the one-period costs associated with housing are estimated. The user cost of housing is the marginal rate of substitution between housing consumption and that of other goods. The calculation of user costs can vary in degree of complexity, from the simple mortgage repayments net of capital gains, to more complex equations accounting for many other variables such as credit rationing and opportunity costs.³ In particular, this article tries to capture the different tax measures that have acted as both incentives and disincentives in the consumption of residential housing. Given the range of taxes applicable to the residential housing market and more importantly the range of taxes which vary with the characteristics of individual owners, it is necessary to narrow our focus further. Browne (1987) and Irvine (1984) previously estimated the user cost of housing in Ireland for a representative family of a married couple with no children purchasing their first house. This is the representative household used in the analysis throughout this paper. The focus is on first-time buyers because recent figures show first-time buyers purchased 48 per cent of new homes, 20 per cent more than any other buyer classification⁴. First-time buyers also represent a vulnerable group of property buyers given their high leveraged positions.

3. The Cost of Housing

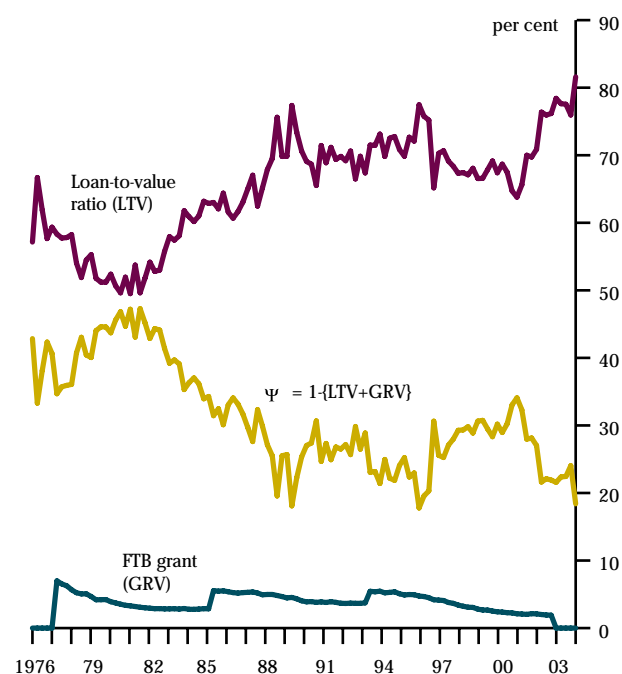
There are a number of costs associated with owner-occupancy of which the mortgage rate and, in turn, the corresponding interest repayment receive most attention. In addition to the mortgage rate, there is an opportunity cost associated with homebuyers' own funds used in the purchase of the property. There are also a range of taxes that apply to both the purchase and the disposal of housing, as well as to the ownership. In the following section we clarify the costs and analyse to what extent they have altered over time.

Decomposition of the Purchase Price: The Share of Housing Finance

The first step is to examine the proportion of the price that is outstanding after accounting for mortgage loans

and Government grants, ψ . A higher ψ requires a greater share of households' own wealth to finance the purchase of a house (Chart 1). Its components consist of those measures that reduce the initial cost of housing; the loan-to-value ratio (LTV) and the first-time buyers grant, expressed as a fraction of house price (GRV).

Chart 1: % Share of House Price Financed by Private Equity



The primary component of ψ is the LTV. The LTV figure is calculated from the Department of the Environment, Heritage and Local Government (DoEHLG) statistics on loans approved. On average, over the period the loan covered about two thirds of the house price. An increase in the LTV leads to a higher level of debt. In periods of financial distress this can lead to a greater probability of default and repossession. If this is coupled with a sharp fall in house prices, mortgage lenders may not be able to recover the value of their initial loan and this could lead to liquidity problems for financial institutions. Tsatsaronis and Zhu (2004) point out that the valuation method, such as the Irish method based on current market values, may foster greater credit availability during periods of sustained house price inflation, leading to pro-cyclical mortgage lending. In May 1977, faced with declining rates of completion in new houses, in particular social housing, the Government introduced the first-time buyers' grant. In an environment of static supply in housing, such a subsidy would effectively be passed on to the building profession and act as a stimulus for supply. Since 1988, completion levels have consistently increased with average growth over the past

³ For a derivation of the user cost of capital in housing see Miles (1994).

⁴ Source: Sherry FitzGerald Research.

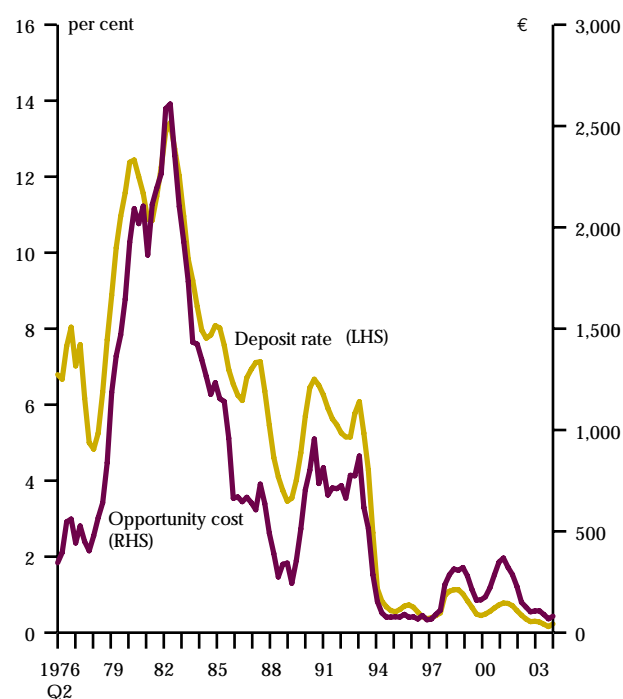
five years of 10 per cent. The grant was abolished in November 2002. In terms of house prices the first-time buyer's grant never amounted to more than 7 per cent of the total value of the house.

Opportunity Cost of Homebuyers funds

The initial element of the user cost is the opportunity cost of purchasing a house, i.e., the return forgone on the house deposit. This relates to the return a potential homebuyer could earn from an alternative investment. Given the length of the sample and the limited extent until recently, which individuals pursued alternative forms of financial investments, the opportunity cost is assumed to be the rate of return on bank deposits.

Chart 2 depicts both the deposit interest rate and the level of funds involved. This is dependent on three variables, namely, the deposit rate, house price and ψ . The high interest rates in 1982 relate to attempts at the time to reduce the balance-of-payments deficit. This concerted effort saw a drain on domestic liquidity with a corresponding hike in interest rates. In the context of European monetary union, the decade leading up to 1993 saw Irish interest rates converge toward German levels, primarily through a reduced Irish risk premia as euro area interest rates moved in tandem with German rates. Similar cuts were experienced in other EMU countries.

Chart 2: Deposit Rate and Opportunity Cost



In 1986, the Minister for Finance introduced a deposit interest retention tax (DIRT). Initially, 35 per cent of

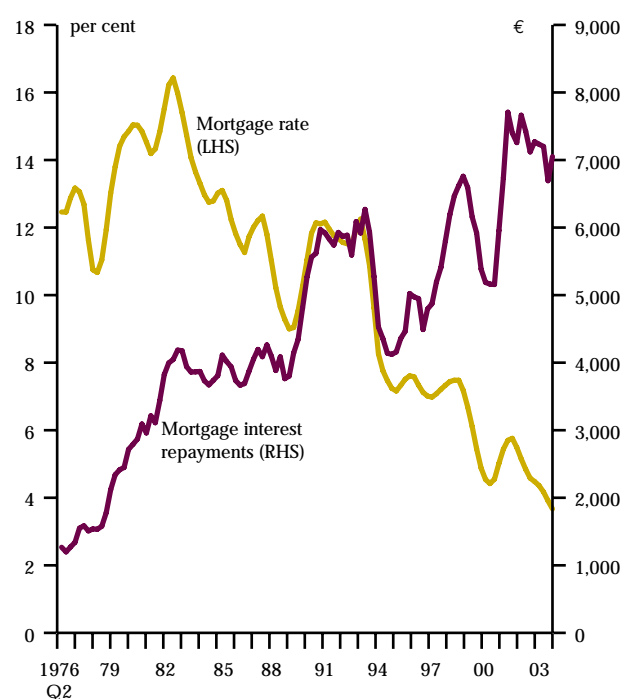
interest earned accrued to the State. Since 1986 the rate of DIRT payable has declined; at present it stands at 20 per cent. The introduction of a tax on deposit interest reduces the actual interest that accrues to the depositor⁵, thereby reducing the return on the alternative investment, namely, interest on deposit accounts.

It is clear from Chart 2 that the opportunity cost of funds invested in housing has been subject to a trend reduction since the early 1980s rendering housing an increasingly more attractive investment.

Net Financing

The second part of the user cost consists of the direct cost of financing the purchase of property. This is calculated as the interest repayment on a mortgage⁶ less the present value of the mortgage subsidy introduced in 1981. Initially, the subsidy was distributed over three years but was extended to a 5-year period in 1982. The subsidy was discontinued in 1986. As with deposit rates, mortgage rates have in general been declining over the period in question (Chart 3). Mortgage rates peaked in 1982 at a rate of 16.75 per cent. Despite the falling mortgage rate, total interest repayment has tended to rise with house prices.

Chart 3: The Direct Cost of Property Acquisition



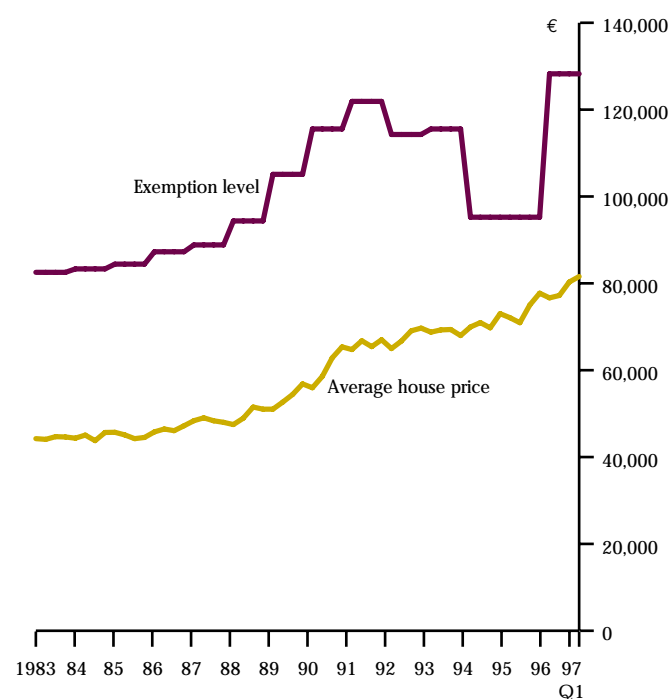
The sample covers a period of financial liberalisation in Ireland. Formal guidelines for bank lending to the private sector ceased in 1984. This was closely followed by deregulation of interest rates in 1985 and new arrangements were put in place allowing for greater competition. Perhaps coincidentally, the period 1992 to

⁵ DIRT rates available in data appendix.

⁶ Because fixed rate mortgages were only introduced in the early 1990s, variable rates are used for this study.

1994 saw a decline in the mortgage rate of over 4 per cent to 7.24 per cent. The primary liquidity ratio declined from 8 per cent in 1991 to 2 per cent in 1999. This increased the amount of funds available to banks for lending activities, which otherwise would have been required to be deposited with the Central Bank. An important event was the entry, in November 1999, of Bank of Scotland into the Irish mortgage market. It was seen as a major shake up of the industry, resulting in greater competition and leading to a wider range of mortgage products for the consumer.

Chart 4: Residential Property Tax Exemption Level



Property Taxes

Residential property tax was levied with effect from 5 April 1983 on all residential properties. The rate charged was 1.5 per cent where the property exceeded a set exemption level and the income of the owner exceeded the corresponding income level⁷. The 1994 budget introduced banding for different property valuations in an attempt to bring greater equity to the incidence of tax, along with a cut in the exemption level to €95,230. The following budget saw these measures scrapped and a return to the previous system. Residential property tax was abolished from 1997. Chart 4 shows the exemption level in relation to the DoEHLG house price series. The average price of a new house never crossed the exemption level; this may reflect either the predisposition of successive governments not to discourage homeownership or simply the downward bias of the inclusion of local authority housing on average house prices.

⁷ Exemption levels are reported in the data appendix.

⁸ See Annex A for a discussion on the data set.

The final property tax examined within the user cost is stamp duty payable on the acquisition of property. Stamp duty is mainly a tax on documents involved in the transfer of property. Prior to 15 June 2000, the purchase of new houses for owner-occupancy was exempt from stamp duty. While the original motivation for this exclusion was to stimulate the building industry, Bacon (1998) states that this disparity between new and second-hand houses may have discouraged first-time buyers from entering the second-hand market. Given the subsequent recovery of the construction industry this policy became redundant. From 1998 onwards, new residential property up to 125 square metres was exempt from stamp duty where it had been purchased by, or on behalf of, persons who would occupy it as their only or principal place of residence. Partial relief was granted in respect of new residential property over this limit.

In addition to the above costs an allowance for depreciation and maintenance is included in the final cost.

4. Incentives to Housing

As well as the cost of holding property a number of fiscal measures offer indirect benefits to holding a residence. These take the form of tax-deductible elements, which are only available to those in possession of property. An important element of the incentives offered by governments is the tax biases in favour of owner-occupancy. In the case of Ireland there are three primary tax reliefs. They relate to capital gains on the disposal of property, mortgage interest relief and imputed rental income.

Capital Gains

Unlike other financial assets, the disposal of a private residence of up to one acre, which has been occupied by the owner throughout the period of ownership as the main residence, is exempt from capital gains tax. This effectively reduces the user cost of capital as the capital appreciation of the property can be completely realised by the homeowner.

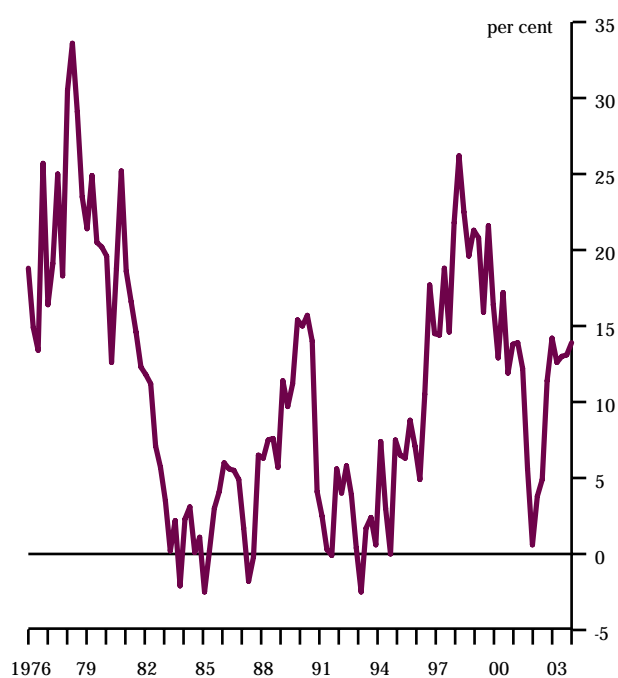
Chart 5 depicts the annual percentage change in house prices⁸. There are two periods of rather slow growth in prices. These occur around the mid-1980s and again in the early 1990s. The initial period from the late 1970s to early 1980s saw vigorous growth in house prices. This was a period of high inflation and strong consumer spending. House price inflation ran at nearly 35 per cent.

This was primarily fuelled by high expectations from tax concessions as well as a new national pay agreement. A key factor was the introduction of the first-time buyers' grant in 1977. In addition to this the number of mortgages increased by over 20 per cent; this in part was brought about by increased liquidity from building societies. In an attempt to curtail spiralling house prices the Minister for the Environment enacted legislation which required that 60 per cent of mortgage funds available to building societies be allocated for cheaper housing.

By 1982 the economy had begun to slow and lending to the private sector waned in response to falling domestic demand. The world economy was still recovering from a period of stagnation. The following year saw a determined effort to reduce the current budget deficit and this was primarily achieved through high rates of taxation.

A period of recovery in house prices followed in the late 1980s, with renewed confidence in Government attempts to control public finances and to moderate wage agreements. On the monetary policy front, a fall in domestic demand saw a fall in the rate of growth in the balance-of-payments deficit. This decline in demand allowed the Bank to reduce its involvement in the Dublin interbank market and gave scope for a reduction in domestic interest rates, following the prevailing international trend.

Chart 5: Annual Appreciation of New Residential Property



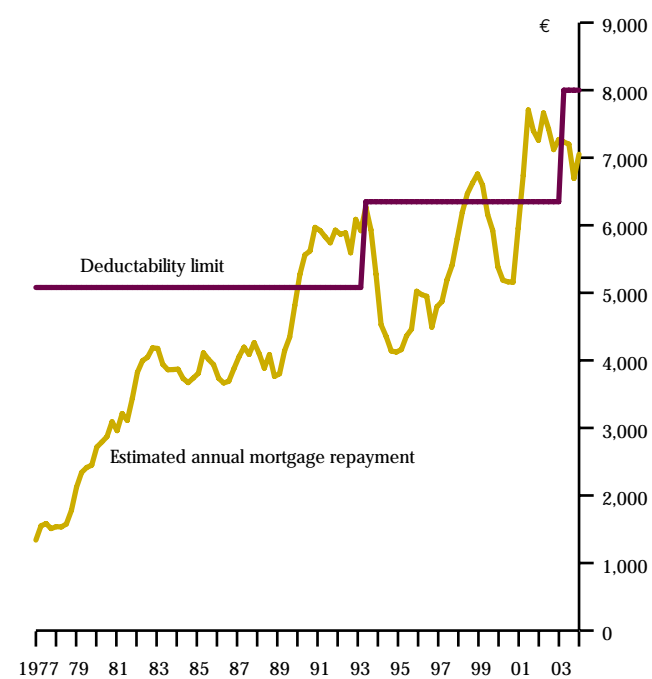
The slight decline in house prices during the early 1990s can be attributed to the exceptional turbulence brought about through the exchange rate mechanism (ERM) of the European Monetary System (EMS), following German reunification. The Central Bank's Short-Term Facility rate increased by three percentage points during this period.

Mortgage Interest Relief

Mortgage interest tax relief (MITR) allows the mortgage holder to offset interest paid on an outstanding mortgage against income tax. Prior to 1974, there was no limit to the amount of mortgage interest that homebuyers could offset against their annual tax liability. The full cost of mortgage interest could be deducted at the marginal tax rate. A maximum value for mortgage interest was introduced in 1974 above which mortgage interest derived no benefit in terms of tax deductibility.

The MITR ceiling was increased on two occasions in 1993 and again in 2003 (Chart 6). Both these increases followed prolonged periods whereby the interest repayments⁹ exceeded the deductibility ceiling i.e. MITR fell below 100 per cent.

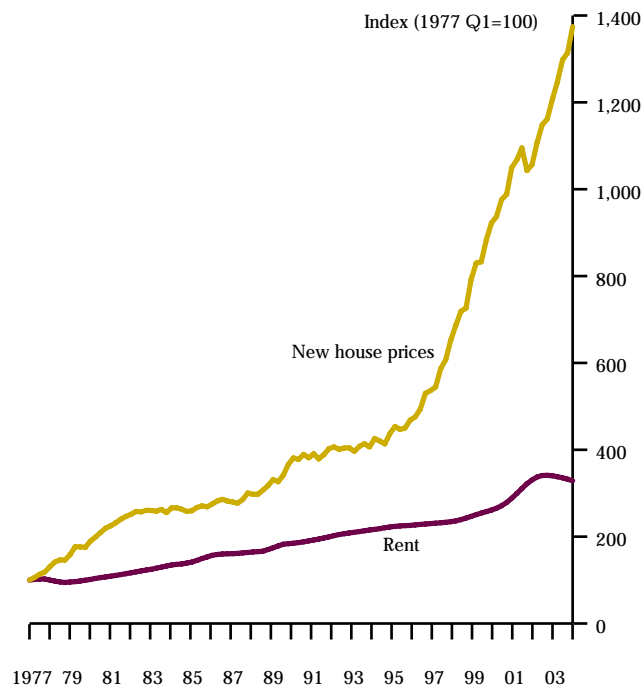
Chart 6: Mortgage Interest Repayments and Deductibility Levels



Mortgage interest relief was phased in at the standard rate of tax in 1994. This saw a reduction in the benefit accruing to homeowners with the deductibility rate falling from 48 per cent in 1993 to 26 per cent by 1997.

⁹ Based on our representative household.

Chart 7: Trend in Rental Rates



Imputed Rental Income

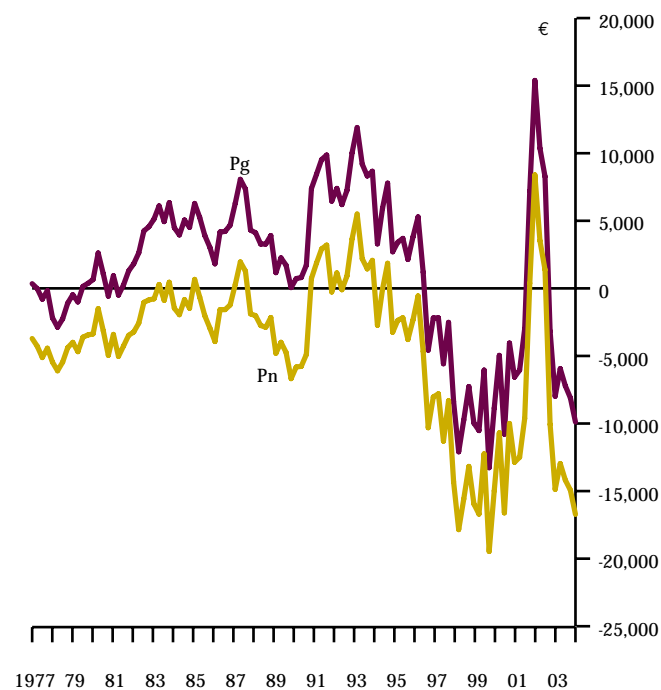
Imputed rental income relates to the notional rent owner-occupiers receive. Since this income is not taxed, unlike rental income to a third party¹⁰, it enters negatively into the user cost. Chart 7 shows the comparison of rent and house prices. While house prices have increased 12 fold, rent levels have risen to a little over three times their 1977 value. Following Bacon and McCabe (2000) the Government introduced a number of deterrents aimed at dissuading investors from purchasing residential property in a bid to ease house price inflation. These included 9 per cent stamp duty on the purchase of property for rent. The reduction in rental accommodation caused rent levels to rise as a result of excess demand. Prior to this, rent levels increased at a relatively constant rate.

Tax Deductibility

Both imputed rental income and mortgage interest tax relief are dependent on the tax rate, which must be taken into account when calculating the user cost of housing. The incentive level increases with the tax rate. As Kenny (1998), however, points out the effect of a fall in tax rates on demand for housing is ambiguous and depends on whether the resulting increase in disposable income offsets the fall in the level of tax deductibility as measured by mortgage interest relief and imputed rental income. Over the 26 years of the sample period, income tax rates have declined from a high of 77 per cent in 1976 to a higher tax rate of 42 per cent in 2004.

¹⁰ See BIS (2002) for an international comparison of the treatment of owner-occupied housing.

Chart 8: Gross Nominal User Cost and Net Nominal User Cost

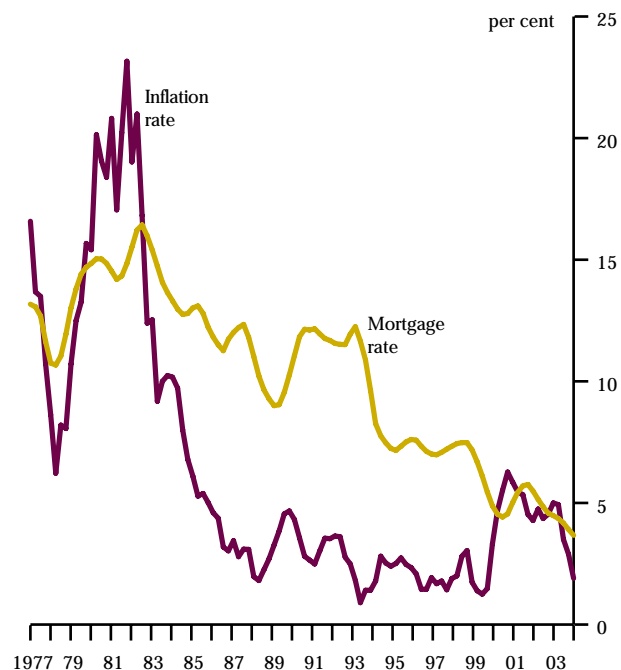


In order to fully assess the effect of tax deductibility on the gross user cost, P_g , and net user cost, P_n , are compared (see Chart 8). The difference between the two series represents the benefit associated with both the tax deductibility of mortgage interest repayments and the imputed rental income that is not taxed. Interest relief on average accounted for 33 per cent of the tax deductible element, ∂ , with rent making up the remainder. Up to 1993 both series ran parallel after which the series tended to merge closer together. This can be explained by the phasing in of mortgage interest relief at the standard rate of tax.

Inflation

Poterba (1984) estimated that the high levels of inflation in the US during the 1970s could have accounted for as much as a third of the increase in real house prices in the US. Inflation has a dual role within the user cost. First, high inflation reduces the real burden of nominal mortgage repayments over the lifetime of the loan, with the real cost effectively shifting to the early years. Chart 9 depicts the inflation rate in Ireland. In general, over the course of the sample inflation has been falling, with annual rates declining from a high of over 23 per cent in 1981, fuelled by rising oil prices and increases in indirect taxation, to 2.9 per cent by the end of 2003.

Chart 9: Mortgage -v- Inflation Rates



Higher nominal rates imply higher nominal mortgage interest repayments, of which some can be offset against income tax. This in effect acts as an inflation subsidy, given the fact that the tax system is not inflation neutral¹¹. The second benefit comes via capital appreciation. Inflation pushes up nominal rates and in turn nominal capital gains on property, which remains untaxed. Thus inflation leads to net gains for mortgage holders.

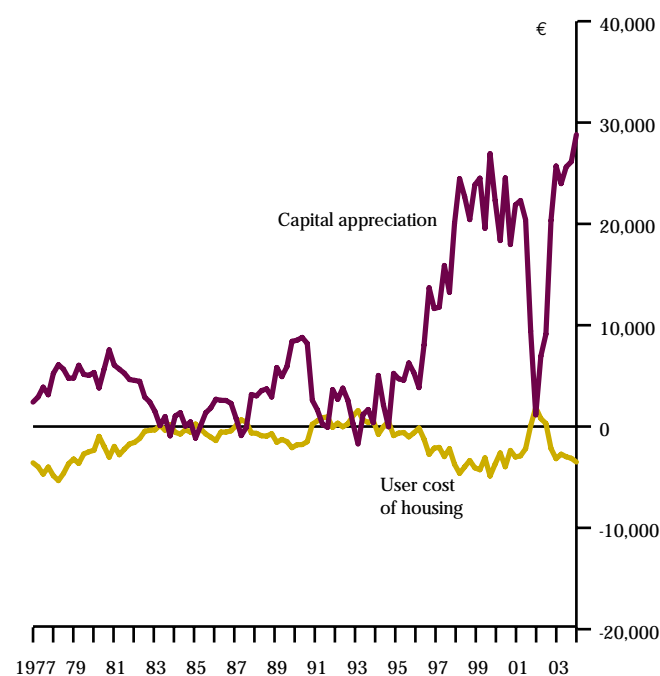
5. Trends in the User Cost of Housing¹²

From the previous sections, it is clear there have been considerable monetary and fiscal policy changes over the duration of this study. So far the discussion has centred on each measure in isolation. In order to understand how all these variations have combined to influence housing demand, it is necessary to analyse the aggregated effect in terms of the user cost of capital for housing. The most salient feature from Chart 10 is the extended periods for which the user cost is negative. A negative user cost implies the benefits from housing (as measured by capital gains and tax deductibility) outweigh the corresponding costs.

The two noticeable periods for which the user cost is negative are the late 1970s and from the mid-1990s onwards. As Chart 10 shows the driving factor in keeping the user cost negative has been the untaxed capital gains.

There was a marked drop in the user cost in 1996. This was fuelled by falls in the nominal value of property. Reports suggest that prices began to decline from the second quarter of 2001 onwards and was most notable at the upper end of the market. This period saw a decline in consumer confidence, which was exacerbated by a general downturn in the world economy. Coupled with this fall in confidence was the planned introduction of anti-speculative measures arising from the implementation of proposals in Bacon and MacCabe (2000). These measures included: the introduction of stamp duty at a new flat rate of 9 per cent on all property bought by investors and the proposal of an anti-speculative property tax of 2 per cent per year on property purchased, which was payable should the property be disposed of within three years of the purchase date. These measures saw a significant withdrawal of investors from the market and were reversed following representation from investors in 2001. Furthermore, the Government brought in measures which allowed for mortgage interest on investment properties to be offset against rental income.

Chart 10: Real User Cost of Capital -v- House Price Appreciation



6. Contributing Factors to the Variation of the User Cost over Time

The user cost framework allows for a tractable analysis of the interaction of both taxation and financial market developments on the demand for housing. A change in either the tax or financial market component that

¹¹ The fact that the tax system is not inflation neutral implies tax-deductible elements of the user cost, such as mortgage interest tax relief, are based on nominal rates and not real rates, hence the examination of nominal values in the previous section.

¹² The formula used to calculate the user cost of capital is presented in the appendix accompanying this article.

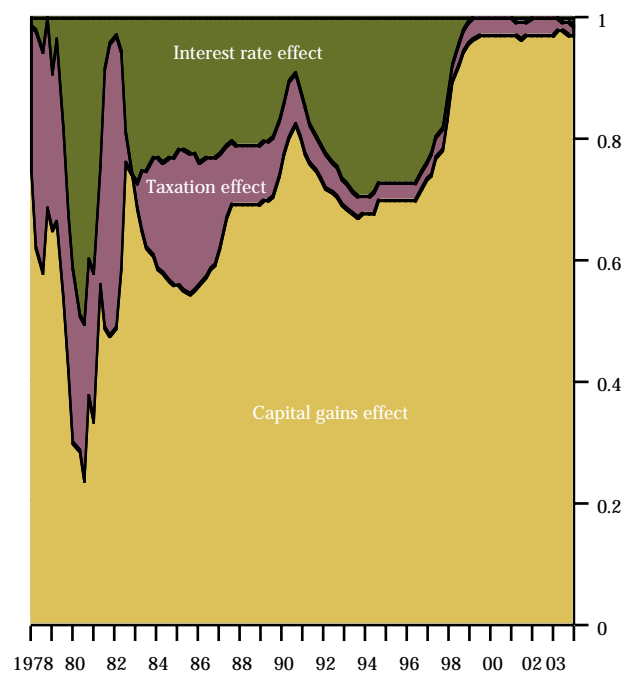
reduces the real user cost may have the effect of stimulating demand. Coupled with inelastic supply in the short-run, which often characterises the housing market, the initial first period increase in demand can permeate through subsequent user costs in terms of greater untaxed capital gains. As such, a one-off change in any of the user cost components that results in fluctuations in the value of the user cost can lead to a sustained price increase in the short to medium term.

How do these fluctuations in the underlying variables contribute to the overall variability in the user cost? For the representative household, the user cost inputs can be grouped into three categories:

- (i) the interest rate element of the user cost. This combines both the mortgage rate, in terms of interest repayments on the mortgage, and the savings rate in relation to the opportunity cost forgone on the potential homebuyers own funds;
- (ii) the net taxation effect. This includes all the fiscal elements of the user cost, both direct taxation and deductibility parts; and
- (iii) the final element is the untaxed capital gains arising from a residence and this represents the overriding benefit to holding a house.

An R-squared statistic is calculated recursively for each of the user cost factors. In essence Chart 11 can be interpreted as the proportion of the variation in the user cost explained by one component holding the other two constant.

Chart 11: Factor Contributions to the Variation in the User Cost of Capital



The first observation is that capital appreciation has accounted for a large proportion of the variation over the sample. The median variation apportioned to capital appreciation is 0.71 i.e., 71 per cent of the variation in the net nominal user cost can be explained by the variation in capital appreciation. An analysis of Chart 11 shows that a high proportion of the change in the user cost during the late-70s can be explained *via* capital appreciation; the period saw annual rates of increase in house prices of over 20 per cent.

Unsurprisingly, the introduction of a generous mortgage subsidy in 1981 led to an increase in the taxation contribution to the overall variance. Following the withdrawal of the mortgage subsidy there has been a steady decline in the contribution of taxation policies to the variation of the user cost. In keeping with other European economies, there has been a shift to a more neutral tax system with regard to residential housing.

The attempts to reduce the balance-of-payments deficit of the early 1980s saw a great deal of volatility in the interest rates and, in turn, led to interest rates having a greater impact on the user cost. This period saw mortgage rates peak at 16.25 per cent. A second period of high interest rate volatility, spanning the mid-1990s, followed as a direct result of the EMS before EMU, whereby Irish interest rates experienced a prolonged downward shift. Subsequently, the latter half of the decade saw house prices appreciate at an average of 14 per cent per annum.

7. Conclusion

There has been much attention given to the state of the Irish housing market and the degree to which the current trend in house prices can be explained by the key fundamentals of housing demand. This article attempts to further address this issue by focusing on the changes in both monetary policy and fiscal aspects affecting housing demand that have occurred over a 27-year period. An *ex-post* user cost of capital is employed to capture the relative influence of all key components underlying demand. The extent to which the purchase of property would benefit the representative household and the effect of fluctuations in the underlying variables contribution to the overall variability in the user cost of housing are examined.

Over the 27 year sample the economy has seen significant changes that have filtered through to the user cost of capital in housing. The most striking has been the general shift in interest rates. A combination of factors has seen a trend reduction in both borrowing and

savings rates. When inflationary pressures of the late-1970s diminished this allowed nominal rates of interest to fall throughout the 1980s. The ERM of the EMS, which was the precursor to the euro in the 1990s, led to further reduction in interest rates via harmonisation of Member States' rates.

Coupled with falling interest rates, there has been a general decline in income tax rates. In terms of the share of the user cost, changes in tax policy and the withdrawal of the mortgage subsidy have been indicative of a move towards a more neutral tax setting thereby discouraging any potential misallocation of resources that might lead to inefficiencies within the economy.

The combination of beneficial fiscal incentives and declining costs, in terms of falling interest rates, have driven down the cost associated with the provision of housing services. However, the most significant factor in rendering the user cost of capital in housing negative has been the untaxed capital gains afforded homeowners. These measures have led to prolonged periods in which the user cost of housing has been negative. This may in part help explain the reason for the growth in house prices during and after these periods.

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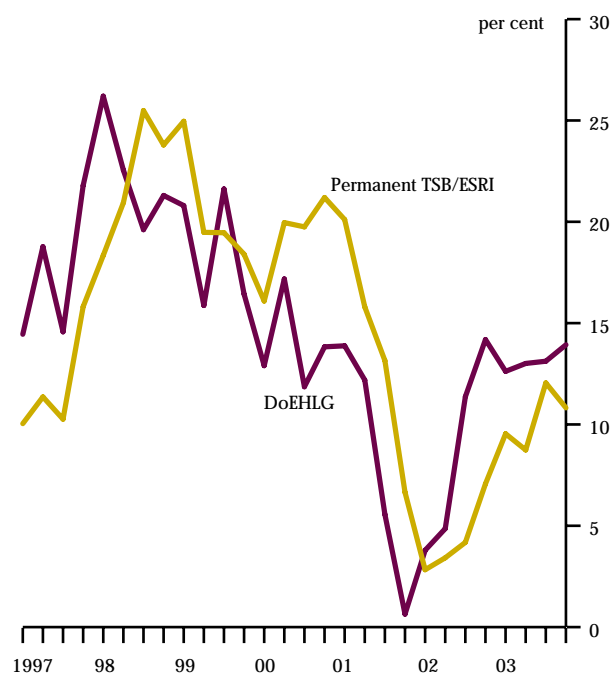
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Annex A: Index of House Prices

For the purposes of this study data from the Department of the Environment, Heritage and Local Government (DoEHLG) are used. The house price figures are derived from data supplied by mortgage lenders on loans approved by them. A number of caveats arise from the use of these data. The first concern is that the series excludes property that was not purchased via a mortgage. While probably a small proportion of the market, this may understate the true change in price. The Irish Auctioneers and Valuers' Institute conduct an annual survey of all property prices. This series, however, lacks the length and frequency to be beneficial to this study.

Secondly, when discussing price indices of heterogeneous goods, such as houses, the statistical methodology used in constructing the index is of interest. A number of variables, such as size, type of house and location, make an individual property unique and are key characteristics in determining price. The DoEHLG housing statistics do not take account of quality differences between houses. At any one time the figure for national house prices may be over or understated, depending on the relative break down of properties being sold. In particular, local authority housing tends to be cheaper in comparison with alternative housing, and during periods when local authority houses are a larger share of all sales, this may introduce a downward bias in the price series.

Chart A.1: DoEHLG Growth Rates -v- Permanent TSB/ESRI Growth Rates



In order to account for the quality mix, a number of different techniques have been developed, Thwaites and Wood (2003) discuss different methodologies, while Conniffe and Duffy (1999) discuss these within an Irish context. The most recent addition to Irish data has been the Permanent TSB/ESRI national house price index. This is a form of hedonic regression where key features attributable to the value of a house are identified. These enter the regression as independent variables. The subsequent coefficients represent the contribution of those characteristics to the overall price. These are then weighted in a base period and successive price increases are calculated. The Permanent TSB/ESRI series lacks the historical length of the DoEHLG series, as such it is not used.

Bacon (1998) attempted to estimate a mix-adjusted house price index using data from the mortgage loan statistical survey. Using limited data he concludes the mix-adjusted technique does not significantly alter the price trends.

Chart A.1 shows the relative nominal price change in both the DoEHLG series and Permanent TSB/ERSI index, while Table A.1 shows the end of year prices of new property for the respective series.

Table A.1: Average New House Prices

€	DoEHLG Average New House Price	Permanent TSB/ERSI New Property Price
1996	91,946	85,906
1997	111,980	99,487
1998	135,827	123,151
1999	158,139	145,815
2000	180,013	176,728
2001	181,171	188,476
2002	206,879	201,808
2003	235,688	223,638

Annex B: Calculation of the User Cost of Capital in Housing

Below we detail the real user cost of housing (UC).

$$UC = \frac{P_n}{CPI}, \quad (1)$$

$$P_n = P_g - \partial, \quad (2)$$

$$\partial = \{\alpha(1 - \psi)r_m Ph \tau^* + Y\tau\}, \quad (3)$$

$$P_g = \psi r_d(1 - \pi)Ph + (1 - \psi)[r_m Ph - MS] - \Delta Ph + D + M + T + SD, \quad (4)$$

$$\psi = 1 - (LTV + GRV), \quad (5)$$

$$D + M = 0.005Ph, \quad (6)$$

$$SD = \eta Ph, \quad (7)$$

P_n is the net user cost of housing. It is net in the sense that it takes account of tax-deductible elements accruing to the owner-occupier, ∂ . In particular interest on mortgage repayments is tax deductible up to certain limits. α is a binding constraint on the amount of interest payable that is tax deductible. Y represents imputed rental income. Imputed rental income relates to the notional rent received by owner-occupiers. τ is the marginal tax rate, both imputed rent and mortgage interest enter as tax-deductible elements and so depend on the tax rate to determine how beneficial both are¹³. The higher the tax rate the greater the amount of mortgage interest relief that can be deducted from the overall tax burden, subject to α . As imputed rental

income is not taxed, an increase in the tax rate increases the bias in favour of owner-occupancy as opposed to the alternative of renting out the property and paying tax on the rental income. P_g denotes the gross nominal user cost of housing. The first term in P_g represents the opportunity cost of the owner's own funds invested in the dwelling. For this we use appropriate deposit rates¹⁴ net of any tax due on deposits, π . The second term in P_g is the mortgage interest repayments; MS is the present value of mortgage subsidies. D and M are depreciation and maintenance the sum of which is assumed to be equal to half a per cent of the value of the property per quarter. ΔPh is the appreciation in value of residential property; it enters negatively as it represents a benefit to the owner. The full benefit is accrued, as an individual's primary residency remains exempt from capital gains tax. T relates to any property taxes which maybe payable whilst in possession of the property. SD is stamp duty, calculated as per equation (7) with appropriate rates η given in the data annex. ψ represents the per cent of the house price that is financed through households' own equity, calculated with LTV representing the loan-to-value ratio¹⁵ and GRV is the first-time buyers' grant expressed as a fraction of the new house price. The first-time buyers' grant enters the user cost in conjunction with the average loan size. We make the explicit assumption that the entire grant is used to help pay for the home.

¹³ $\tau = \tau^*$ for all observations prior to 1994 at which time mortgage interest tax relief was phased in at the standard rate of tax.

¹⁴ All deposit and lending rates used are the median figure of the range reported in The Central Bank and Financial Services Authority of Ireland Quarterly Bulletins.

¹⁵ Calculated as average loans approved as a percentage of new house price from the Department of the Environment, Heritage and Local Government quarterly housing bulletin.

Data Appendix

Mortgage Interest Tax Relief

Deductibility of mortgage interest payments from taxable income:

Pre 1974: No limit on the amount of interest deductible at marginal rate.

Mortgage Interest Tax Relief Ceiling

€	
Relief available in period 1974 to 6 April 1995	
Single	2,540
Widow(er)	3,657
Married Couple	5,079
Relief available in period 6 April 1995 to 2003	
Single	3,170
Widow(er)	4,570
Married Couple	6,350
Relief from 1 January 2003 to 2004	
Single	4,000
Widow(er)	8,000
Married Couple	8,000

Mortgage Interest Tax Relief

Tax Year	Marginal tax rate ^a	Standard tax rate ^a	Effective tax rate
1993/94	100%	0%	48.00%
1994/95	75%	25%	42.75%
1995/96	50%	50%	37.50%
1996/97	25%	75%	32.25%
1997/98	0%	100%	26.00%

^a See income tax for appropriate rates.

First Time Buyers Grant

Introduction of first time buyers' grant in May 1977:

1978 to 1982:	€1,270
1 May 1985 to 1993	€2,540
1993 to 14 November 2002	€3,810

Mortgage Subsidy

Available on the purchase/construction of new house

1981 Q2-1982 Q1: €3,810 over 3 years

Year 1 =	€1,906
Year 2 =	€1,015
Year 3 =	€635

1982 Q2-1986: €3,810 over 5 years

Year 1 =	€1,270
Year 2 =	€1,016
Year 3 =	€762
Year 4 =	€508
Year 5 =	€254

Subsequently discontinued.

Other Taxes

- No capital gains tax on primary residence over the sample period
- Property Taxes were abolished in January 1978
- Residential property tax of 1.5% charged on the excess of all relevant residential properties of a person over a market value, outlined below. Introduced in Budget 1983. Abolished with effect on or after 5 April 1997. Further information available in Cooney et al (2000).

Residential Property Tax Limits (15 June 2000 to 2004)

Year	Income Year Ended 5 April	Valuation as at 5 April
	€	€
1983	25,394.76	82,532.98
1984	27,972.33	83,322.75
1985	29,705.52	84,426.15
1986	31,067.95	87,266.56
1987	32,133.26	88,844.84
1988	32,752.89	94,368.20
1989	33,843.60	105,098.80
1990	35,298.72	115,546.20
1991	36,187.54	121,894.90
1992	34,917.80	114,276.40
1993	35,679.64	115,546.20
1994 ^a	31,743.45	95,230.36
1995	37,457.27	119,355.40
1996	38,219.12	128,243.50

^aA flat rate of tax was introduced for residential property valued under €126,974. See following table.

Valuation not exceeding €	Tax Due €
101,580	32
107,928	95
114,276	159
120,625	222
126,974	286

For residential property valued at over €126,974, the following rates applied:

First €31,744	@ 1.0%
Next €63,487	@ 1.5%
Balance	@ 2.0%

Stamp Duty (15 June 2000 to 2004)

Value of property €	First-time buyer	Other owner occupier/investor
0 to 127,000	Exempt	Exempt
127,001 to 190,500	Exempt	3.00%
190,501 to 254,000	3.00%	4.00%
254,001 to 317,500	3.75%	5.00%
317,501 to 381,000	4.50%	6.00%
381,500 to 635,000	7.50%	7.50%
635,000 and over	9.00%	9.00%

Tax Rate Chart

Tax year	Income tax rates (%)					
1975/76	26	38.5	49.5	60.5	71.5	77
1976/77	26	38.5	49.5	60.5	71.5	77
1977/78	20	25	35	45	50	60
1978/79	20	25	35	45	50	60
1979/80	25	35	45	55	60	
1980/81	25	35	45	55	60	
1981/82	25	35	45	55	60	
1982/83	25	35	45	55	60	
1983/84	25	35	45	55	60	65
1984/85	35	45	55	60	65	
1985/86	35	48	60			
1986/87	35	48	58			
1987/88	35	48	58			
1988/89	35	48	58			
1989/90	32	48	56			
1990/91	30	48	53			
1991/92	29	48	52			
1992/93	27	48				
1993/94	27	48				
1994/95	27	48				
1995/96	27	48				
1996/97	27	48				
1997/98	26	48				
1998/99	24	46				
1999/00	24	46				
2000/01	22	44				
2001 to 2004	20	42				

**Deposit Interest Retention Tax (DIRT)
Rates (%)**

Tax year	Rate
1986/87	35
1987/88	35
1988/89	32
1989/90	30
1990/91	29
1991/92	27
1992/93	27
1993/94	27
1994/95	27
1995/96	27
1996/97	27
1997/98	26
1998/99	24
1999/2000	24
2000/01	22
2002 to 2004	20

