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ALAN BARRETT
IDE KEARNEY
MARTIN O'BRIEN

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Special Articles

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by
Morgan Kelly

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ON THE LIKELY EXTENT OF FALLS IN IRISH HOUSE PRICES

Morgan Kelly[*]

Abstract

Looking at house price cycles across the OECD since 1970, we find a strong relationship between the size of the initial rise in price and its subsequent fall. Were this relationship to hold for Ireland, it would predict falls of real house prices of 40 to 60 per cent over a period of 8 to 9 years. The unusually large size of the Irish house building industry suggest that any significant house price fall that does occur could impose a difficult adjustment on the economy.

1. Introduction

The purpose of this paper is to look at the likely behaviour of Irish house prices based on the experience of economies that have gone through similar booms. Looking at nearly 40 booms and busts in OECD economies since 1970, we find that the size of the initial boom is a strong predictor of the size and duration of the subsequent bust.

Typically, real house prices give up 70 per cent of what they gained in a boom during the bust that follows. This is a remarkably robust relationship, holding across very different OECD housing markets over more than 30 years.

Were this relationship to hold for Ireland, it would predict a fall in real house prices of around 40 to 60 per cent, over a period of 8 or 9 years. Assuming an inflation rate of 2 per cent, this would translate into an annual fall of average selling prices of 6 to 7 per cent.

Falls of this magnitude and duration are not unprecedented internationally. For example, the real price of Dutch houses fell by around half during the 1980s, as did those in Finland during the early 1990s. However, other large housing busts occurred in

economies with high rates of housing occupancy and relatively slowly growing stocks of houses. In Ireland, by contrast, housing stock has been growing at around 5 per cent per year, with about 15 per cent of the housing stock lying empty, increasing the potential for larger price falls than in previous OECD housing busts.

Our estimate is in contrast with existing studies that measure over-valuation by the size of a regression residual and find over-valuation of around 20 per cent. We demonstrate below, however, that unless based on very long run time series, such regressions are effectively meaningless.

The principal macroeconomic reason for being concerned about a fall in Irish house prices is its impact on residential investment. Typically, an industrialised economy gets around 5 per cent of its income from building new houses, around the same that it gets from household spending on recreation. Ireland currently derives nearly three times this amount from building and selling houses. Any sudden fall of residential investment to normal international, and national historical, levels, could have a substantial impact on national income, government finances, and unemployment: fewer than 15 per cent of construction workers are immigrants.

Falls in residential investment, moreover, can be sudden as the example of Arizona shows. Until late 2005, Arizona was experiencing a house price and construction boom similar to Ireland's. Then, as sales of new houses stalled around the start of 2006, building fell suddenly: from around 8,000 starts in May 2006 (similar to Irish levels last year) to around 3,000 in November.

The stagnation of the housing market even below the stamp duty threshold makes it evident that the reduction or elimination of stamp duty will not alter the basic dynamics of the housing market. Markets like housing are driven by fear of offering less than other bidders and ending up with nothing. With a large inventory of unsold houses, the *permanent-tsb* house price index showing monthly falls, and the irishpropertywatch.com tracking site showing that cuts in asking prices of €50,000 are now commonplace, potential buyers have an incentive to wait and see if prices will fall further. At the same time, rents are likely to fall as discouraged vendors attempt to let out empty properties.

The rest of this paper is as follows. Section 2 rehearses the relevant economic theory of rational frenzies in asset markets. Section 3 looks at the nearly 40 cases since 1970 where OECD economies have experienced house price rises followed by falls, and shows that the magnitude of the boom is a strong predictor of the size and duration of the subsequent bust. Section 4 shows how the stagnation of rents since 2000 while house prices doubled means that the Irish housing market has not been driven by strong fundamental demand. Section 5 looks at the possible magnitude and duration of house price falls, and their potential macroeconomic effects.

2. Economic Theory

The familiar efficient markets hypothesis predicts that changes in asset prices are unpredictable. The price reflects individuals' information about asset's present value and changes as this information changes. Agents with good information buy, driving up the price, and those with bad information sell, driving it down.

However, instantaneous revelation of information through trade is not possible in house markets due to the very large transaction costs involved. In addition, the market lacks means for individuals to convey negative information through short sales.

As a result, housing markets are better modelled as information cascades: the actions of other agents signal their private information and can cause individuals to ignore their own signals and follow the herd (Bikchandani, Hirshleifer and Welch, 1992). Two models in the cascade literature are particularly useful for understanding the dynamics of housing markets: the rational frenzies model of Bulow and Klemperer (1994) and the wisdom after the fact model of Caplin and Leahy (1994).

Bulow and Klemperer (1994) model rational frenzies in auctions where participants reveal their valuations by bidding. Suppose that there are k items available. If individual reservation prices were known with certainty, everyone would wait until the price fell to just above the reservation price of the $k + 1$-th highest person, and then all buy together. In practice, only the probability distribution of reservation values is known, and by bidding, or failing to bid, individuals reveal information about their valuations, allowing all participants to update their estimates about the value of the $k + 1$-th highest reservation price.

As a result, bidders with very different valuations have very similar willingness to pay. Price drops until one person bids. The information this reveals about the true distribution of willingness to pay can set off a bidding frenzy among the other bidders, driving up price again until it becomes clear that price is again above willingness to pay. Bidding then stops, causing prices to collapse until another bidding frenzy starts.

As well as being volatile, Bulow-Klemperer predict that the relationship of house prices to fundamentals such as income and interest rates need not be straightforward. To the extent that individuals depart from Bayesian rationality, altering reservation values in response to observed trends in prices, these effects will be amplified.

Caplin and Leahy (1994) look at investment where individuals have Gaussian signals. If the true state is bad, individuals continue to invest, driven by the dominating effect of past actions. Eventually, however, because signals are not bounded, a few agents get sufficiently bad signals to induce them to stop investing, causing priors rapidly to move to a belief that the state is bad, leading to a market crash and "wisdom after the fact".

Economic theory predicts that house prices should not follow a random walk, but should be a mean-reverting process of booms and crashes around a slowly increasing trend reflecting the growth of household income. This is what the international data show.

Large falls in real house prices in the aftermath of housing booms are common internationally. Table 1 shows the 18 cases since 1970 where OECD economies have experienced falls in real house prices of at least 20 per cent, along with the previous price rise, and the duration of the fall. It can be seen that, in contrast to stock or currency markets, falls are prolonged, usually lasting 5 to 7 years, with the Netherlands, Switzerland, and Japan all experiencing more than a decade of falls. This reflects the reluctance of sellers to cut nominal prices, meaning that inflation does most of the work in reducing real prices.[1]

Table 1: Magnitude and Duration of Falls in Real House Prices

	Peak Year	% Fall	Previous Rise	Duration of Fall
Netherlands	1978	50	98	7
Finland	1989	-48	109	6
Switzerland	1989	-39	70	10
Norway	1987	-39	53	6
Denmark	1978	-36	22	4
New Zealand	1975	-35	57	5
Sweden	1979	-35	26	6
Spain	1977	-33	24	4
Denmark	1986	-32	52	6
Japan	1974	-31	56	4
Italy	1982	-30	84	4
Finland	1974	-30	22	5
Japan	1991	-27	78	10
Sweden	1990	-27	38	6
Italy	1992	-26	65	6
Switzerland	1973	-26	34	4
Ireland	1981	-22	53	5
Canada	1981	-20	6	4

Shiller (2006) looks at three long series of real house prices: Amsterdam from 1628 to 1973, Norway from 1819 to 1989, and the United States from 1890 to 2005. In all cases he finds that although there are substantial and long lasting peaks and troughs, there is scarcely any upward long-run trend in prices.

Figure 1 shows the same pattern for smaller OECD economies: the Nordic countries, the Netherlands, and New Zealand, since 1970. The diagram shows the ratio of average house prices to disposable income but real house prices show a very similar pattern. Again, as economic theory predicts, there is considerable volatility and no sign of long-run trends. In contrast to stock price data, the tendency of prices to return to their long-run average means that

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[1]The referee observes the one small economy that is notably absent from the list of booms and busts is Belgium. It would be useful to identify the sources of this stability, and whether they could be adapted to reduce future volatility in the Irish market.

the size of price falls can be predicted from the size of the price rise that preceded them.

Figure 1: House Prices Relative to Disposable Income in Smaller OECD Economies Since 1970. Index: 2000 equals 100
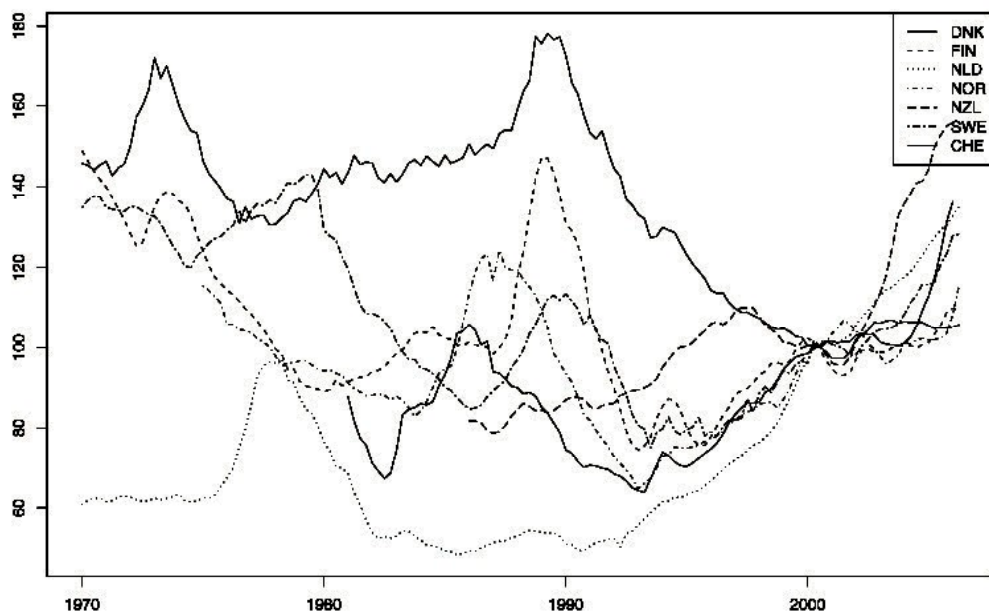

Figure 2 plots the size of increase in house prices for 17 OECD economies, against its subsequent fall.[2] For clarity, we exclude other variables such as interest rates that other studies find to have limited explanatory power for house prices: we are focusing on weak form efficiency of housing markets.

To estimate the peaks and troughs in each series for each country, we first calculated percentage changes for each quarter. A Friedman supersmoother (implemented in the R statistics package) was then applied to the percentage changes to eliminate short-run fluctuations. Peaks and troughs were then identified as the end of runs of positive or negative changes in the smoothed series, and actual price changes calculated between these points.

Percentage rises and subsequent falls are calculated relative to different values: troughs and peaks respectively. Remember that a rise of p per cent only needs a fall of $p/(1 + p)$ per cent to reverse it. To eliminate this complication, all rises in Figure 2 and subsequent regressions are expressed as a percentage of peak values: for example a rise from 50 to 100 is treated as a 50 per cent rise, rather than a 100 per cent one.

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[2]These economies are Denmark; Finland; Ireland; Netherlands; Norway; New Zealand; Sweden; Switzerland; United States; Japan; Germany; France; Italy; Britain; Canada; Australia and Spain.

Figure 2 shows that there is a strong linkage between rises in real house prices and subsequent falls. There is one evident outlier corresponding to a dip in house prices in Spain that occurred in the early 1990s in an otherwise continuously up-ward trend that saw real prices quadruple between the mid-1980s and the present.

Figure 2: Percentage Rises in Real House Prices (Expressed as a Percentage of Peak Values), and Subsequent Falls for OECD Economies Since 1970
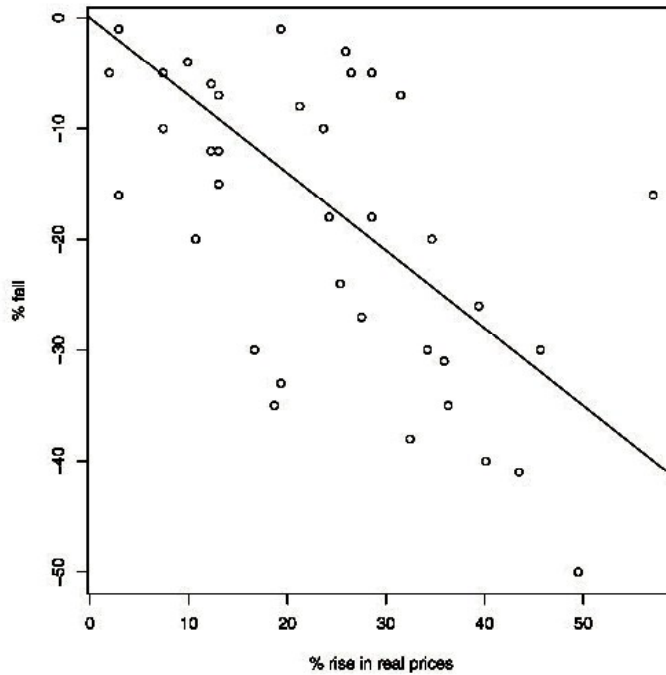

Table 2 shows a regression of the percentage fall in house prices against their previous rise, both including and excluding the Spanish early-1990s outlier, for real house prices and the house price to income ratio. The slope of -0.7 for real house price means that 70 per cent of the rise during a boom (expressed relative to the peak value) is lost during the subsequent bust.

It is worth emphasising that these regressions are simply a summary of data. Beyond being a standard test of weak form efficiency of the housing market, they do not purport to test any model. In particular, the approach here can convey no information about the timing and magnitude of peaks preceding troughs.

By comparison Glaeser and Gyourko (2006) find weaker mean-reversion in house prices in US metropolitan areas: a one dollar rise over five years is typically followed by a fall of 30 cents over the following five years.

Table 2: Predictability of House Price Falls from Preceding House Price Rises

	Intercept	Initial Rise	SER	R_2	BP	N
			Real House Prices			
All	-0.0489 (0.0363)	-0.5746** (0.131)	0.1085	0.3548	0.022	37
Excl. Spain	-0.0252 (0.0356)	-0.7025** (0.1347)	0.1021	0.4445	0.483	36
			House Prices Relative to Disposable Income			
All	-0.1168** (0.0389)	-0.6115** (0.1899)	0.1275	0.219	0.187	39
Excl. Spain	-0.104** (0.0395)	-0.713** (0.2013)	0.1259	0.2584	0.428	38

OLS regression of percentage falls in real house prices and house prices relative to income on preceding rises for 17 OECD economies from 1970 to the present. Standard errors in parentheses. *denotes significance at 5 per cent, ** at 1 per cent. BP is p-value of studentised Breusch-Pagan test for heteroskedasticity.

What is notable about the diagram and regressions is how strong the relationship between price rises and falls is. Across very different housing markets in very different economies over a period of more than 30 years, there is a common relationship between the magnitude of booms and subsequent busts. Rent-price series show similar mean reversion but because of the small size of the rented sector in many economies, and the presence of rent controls in part of the period, the data are not as reliable as the real price and price-income series.

As always, national averages conceal substantial variations across regions and types of property. During the last British housing crash, for example, while selling prices nationally fell on average by 10 per cent, they fell in East Anglia by 40 per cent; while models such as Glaeser and Gyourko (2006) predict that the upper end of the market should be the most volatile.

As Table 1 suggests, there is a relationship between the magnitude of real price falls and their duration. Table 3 gives the results of a regression of the average annual rate of house price falls on their magnitude, and shows the two to be closely related. If p is the proportionate price fall, so prices fall from 1 to $1 - p$ over t years, it follows that $r = \ln(1 - p)/t$ is the average rate of decline. Table 3 gives the results of a regression of r on p. For every 10 per cent extra decline in real prices, the annual rate of decline rises by 1.5 percentage points.

Figure 3: Rate Versus Magnitude of Falls in Real House Prices for 17 OECD Economies Since 1970
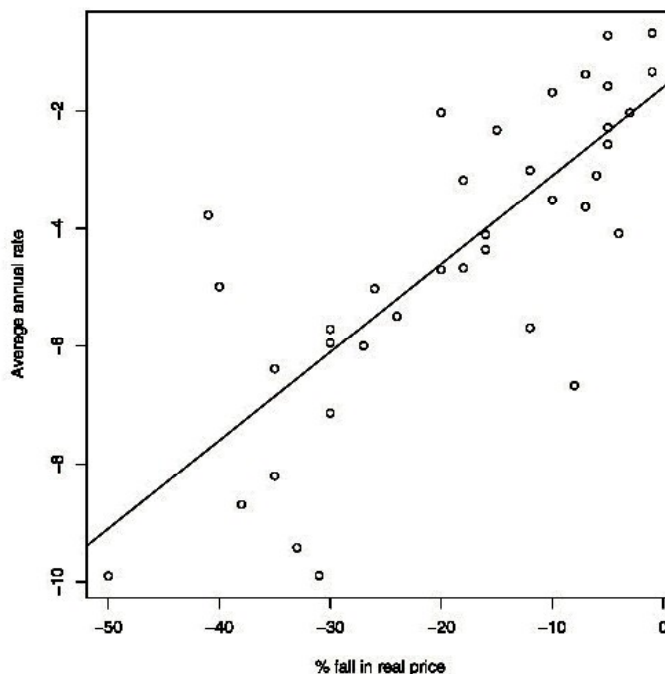

Table 3: Connection Between Annual Rate of Decline and Magnitude of House Price Falls

Intercept	Price Fall	SER	R_2	BP	N
-1.6784** (0.4709)	0.1494** (0.0206)	1.6434	0.6014	0.121	37

OLS regression of average rate of fall of real house prices on percentage fall for 17 OECD economies from 1970 to the present. Standard errors in parentheses. *denotes significance at 5 per cent, ** at 1 per cent. BP is p-value of studentised Breusch-Pagan test for heteroskedasticity.

**4.
The Irish
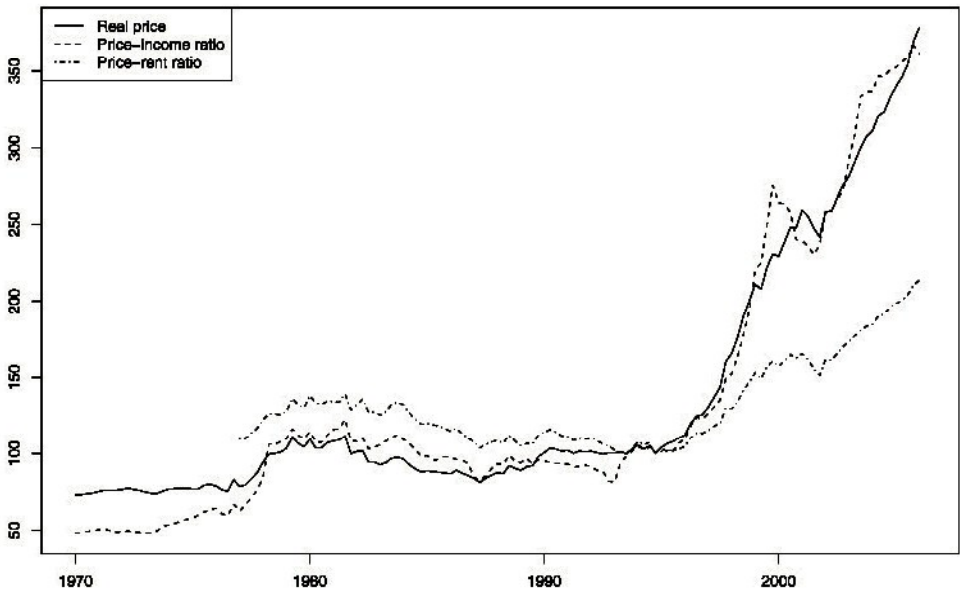Housing
Bubble,
Causes and
Consequences**

The evidence of nearly 40 cycles in house prices for 17 OECD economies since 1970 shows that real house prices typically give up about 70 per cent of their rise in the subsequent fall, and that these falls occur slowly.

Before looking at what these numbers may imply for Ireland, it is necessary to dispose of the idea that Irish house prices merely reflect strong fundamentals: rising income and increased household formation due to the age structure of the population, declining household size, rising employment, and immigration.

This argument is hard to sustain. If the rise in house prices were due to increased income and more people needing somewhere to live, we would have observed rents rising alongside house prices. Figure 4 shows how house prices have risen far faster than either

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rents or income. In fact, while rents doubled relative to income between 1995 and 2000, the ratio has remained unchanged since. The failure of rents to rise, along with the number of recently built units that have been bought but are lying empty (FitzGerald, 2005), suggests that the Irish housing market has left the dull world of fundamental values far behind it.

Figure 4: Irish House Prices Since 1970 in Real Terms, Relative to Income, and Relative to Rent. Index: 1995 Equals 100

A back of envelope calculation of the fundamental price of housing is the following. Abstracting from maintenance costs (which typically run around one month's rent) suppose that housing generates an annual rent of *n*. This is a fraction v of disposable income *y* which is expected to grow through time at rate *g*. The present value of this infinite income stream is then

$$p = \frac{vy}{r - g}$$

where r is the discount rate. As Figures 1 and 2 and Table 1 show, housing is not a risk-free asset, and this discount rate needs to exceed the risk-free rate by an amount reflecting the fundamental risk of the asset. For housing, fundamental risk is large: housing is the largest item by far in most people's asset portfolio and price changes are strongly correlated with income growth. To be conservative, however, we can assign a value of r of 8 per cent, equal to the long run real return on equities.

The ratio of fundamental price to rent is $1/(r - g)$. To explain why Irish house prices have doubled relative to rent since 2000 we need to ask if there is any reason to suppose that new information has arrived causing long run estimates of $(r - g)$ to be rationally halved.

Ireland's stagnant exports, diminishing competitiveness, and the increasing structural problems of sectors such as IT and pharmaceuticals, would suggest that estimates of long-run income growth for the Irish economy g should have fallen in this period. While it may be the case that increased international demand for quality assets may be driving down equilibrium returns (Caballero, 2006), there is no reason to believe that long-run expected returns on risky assets r have halved in the past 7 years.

As White (2006) has observed, there is considerable variation in price-rent ratios within Dublin, with values in the range 80-100 at the top of the market. These values recall the peaks of the dotcom bubble and can be rationalised, with a discount rate $r \approx 0.08$, only with real long-run growth of income of 6 to 7 per cent, equivalent to a doubling of real income every 10-12 years. This is the rate achieved by Korea during its transition from effectively the stone age to an industrial economy but has not been remotely approached by any rich economy. Alternatively, assuming an equilibrium price-rent ratio in the region of 15, it suggests that large falls in prices, of the order of 85 per cent, might be needed for the top of the market to return to fundamental value.

Again it is worth reminding ourselves that, just as in stock markets, fundamental measures such as price-earnings ratios have limited explanatory power for price changes in the short run.

While other parts of the market appear less over-valued, they are still expensive by international standards. The Global Property Guide website reports that the average Dublin apartment rents for around 4 per cent of its purchase price. Only Madrid among major cities has a lower ratio. By comparison, London apartments return nearly 6 per cent, and Amsterdam and Paris over 8 per cent.

5. International Perspectives on the Irish Housing Bubble

Were Ireland to experience the same housing dynamics as every other OECD economy, except Spain in the early 1990s, what sort of price changes might be expected? Recall that Table 2 predicts a 7 per cent fall for every 10 per cent rise (relative to peak values) of real prices from their trough level, with a standard error of 10 per cent.

Since the mid-1990s, real house prices have risen from an index level of 100 to around 350, and increase in terms of peak value of 70 per cent. If 70 per cent of this rise were to be subsequently lost – as occurred during our previous bust in the early 1980s – the predicted fall in real house prices would be 50 per cent with a standard error of 10 per cent. In other words, a 68 per cent confidence interval for price falls would be in the range of 40 to 60 per cent. There would be one chance in eight of a price fall of only 30 to 40 per cent, just as there is a predicted one chance in eight of a fall of 60 to 70 per cent.

Similarly, Table 2 predicts, given an approximately 70 per cent rise in the price income ratio, that the price income ratio will fall by around 60 per cent, with a standard error of around 12.5 per cent.

It must be emphasised that these estimates are extrapolations: no economy in our sample of busts following booms experienced a rise as large as Ireland's. A fall in real prices of 50 per cent from Table 3, implies a predicted annual rate of decline of around 9 per cent, with a standard error of approximately 1.5 per cent. This translates into a decline of around 8 years, of the same order of magnitude as that experienced in the Netherlands in the 1980s or Britain in the 1950s. Assuming an inflation rate of 2 per cent, this implies an annual fall in selling prices of 7 per cent.

These estimates may be unduly optimistic. In all the housing cycles on which the regression was based, housing stock was, for practical purposes, fixed. In Ireland, by contrast, the number of housing units is growing at around 5 per cent per year, which would suggest the potential for larger falls than those experienced in other OECD housing slowdowns.

5.1 FUNDAMENTAL REGRESSIONS

The prediction that Ireland may experience house price falls in the range of 50 per cent, is a good way from the OECD estimate (Rae and van den Noord, 2006) that Irish houses are overvalued by only around 20 per cent. However, the OECD methodology, and that of similar studies, is problematic. Such studies run a regression of house prices on interest rates, disposable income, employment and other fundamental variables. The regression residuals are then equated with the degree of over- or under-valuation in the market.

To see this, consider a regression of Irish real house prices on disposable in-come since 1976 gives a residual for the last quarter of 2006 of 17 per cent. If instead house prices had changed by twice as much each quarter as they did, the regression residual would find that they were 35 per cent over-valued, while prices would be four times as high as they are now. Measuring over-valuation using regression residuals is a valid approach if very long-run series are available to tie down coefficient values, but using short-run series, as existing studies do, leads to meaningless results.

5.2 MACROECONOMIC CONSEQUENCES

House price falls have three effects. First, households feel less wealthy and consume less. Evidence from the United States points to a final long-run marginal propensity to consume from housing wealth of around 10 per cent: a $100,000 rise in property values, increases household consumption eventually by a total of $10,000 (Carroll, Otsuka and Slacalek, 2006). Second, banks face more bad loans, and become more cautious in their lending, leading to further falls in creditworthiness through the standard financial accelerator. Finally, the value of Tobin's q for residential investment falls, reducing house building. Most countries devote about 5 per cent of national income to building houses and in a typical housing bust, this falls to around 4 per cent of national income.

In most cases then, housing busts are uncomfortable, but not macroeconomically disastrous events. How about Ireland? There is some evidence that the wealth effect on consumption might not

be as strong as in the United States: there has been no fall in personal saving in Ireland during the housing bubble, and households have not consumed home equity through second mortgages (Hogan and O'Sullivan, 2006). Similarly, the larger banks which dominate lending are well capitalised and the banking system has, until recently at least, avoided the worst excesses of the sub-prime mortgage market, although it is likely that many interest-only and 100 per cent mortgages could go sour, especially given the ease with which delinquent borrowers can relocate to England.

It is the scale of the Irish house building industry that makes a fall in house prices potentially troubling. While most economies derive only 5 per cent of their income directly from residential construction, in Ireland house building accounts for around 15 per cent of national income.

Effectively, the recent growth of the Irish economy looks similar to the unstable case of an old-fashioned multiplier-accelerator model. The employment growth in the Celtic Tiger period of the 1990s led to increased demand for housing, reflected in rising real house prices and rent to income ratios. This stimulated house building, which generated more employment, leading to more demand for housing, and so on. Effectively, the Irish economy has come to be driven by building houses for all the people whose jobs have come, directly or indirectly, from building houses.

It is hard to envisage how a fall in house building from 15 per cent to 5 per cent of national income might be achieved without considerable macroeconomic dislocation. Building booms, moreover, tend to end suddenly: the example of Arizona in the summer of 2006 shows how a housing market can move in the space of a few months from buyers queuing overnight to buy, to empty tracts of new houses being priced below construction cost and still failing to sell.

6. Conclusions

This paper has taken an international perspective on the Irish housing boom. We have shown that there is a close relationship historically across very different economies and housing markets between the size of increases in real house prices, and subsequent declines. If this relationship were to hold for Ireland, the expected fall in average real house prices is in the range 40 to 60 per cent, over a period of around 8 years. Such a fall would return the ratio of house prices to rents to its level at the start of the decade. Given the unusual reliance of the Irish economy on building houses, the effects of any such fall on national income may be somewhat larger than that experienced at the end of other housing bubbles.

Policy implications are straightforward. Booms and busts are a normal part of property markets. The government did not cause the current boom, and is powerless to do anything about a subsequent bust. In particular, cuts in stamp duty will not change buyers' self-fulfilling incentive to wait and see if prices fall further.

Blanchard (2006) has observed that Euro-area economies appear at risk of rotating recessions: increased domestic demand drives up real wages and erodes competitiveness, but the impossibility of

devaluing means that prolonged rises in unemployment become the only means to reduce real wages. Notable current examples are Italy and Portugal. There may be some risk that the sharp fall in Irish competitiveness since 2000, which has been disguised and, to some extent, caused by the construction boom, may require a lengthy period of high unemployment to reverse.

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