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Managing Housing Bubbles in Regional Economies under EMU: Ireland and Spain

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Abstract. With the advent of EMU monetary policy can no longer be used to prevent housing market bubbles in regional economies such as Ireland or Spain. However, fiscal policy can and should be used to achieve the same effect. This paper shows that the advent of EMU relaxed existing financial constraints in Ireland and Spain, allowing a more rapid expansion of the housing stock in those countries to meet their specific demographic circumstances. However, the failure to prevent these booms turning into bubbles did lasting damage to the two economies, damage that could have been avoided by more appropriate fiscal policy action.

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Managing Housing Bubbles in Regional Economies under EMU: Ireland and Spain

1. Introduction¹

Over the last thirty years the housing market has been a source of significant economic instability on at least one occasion in each of a wide range of OECD economies. When housing bubbles have burst they have caused substantial damage to the affected economy. As a result, they ought to be a cause for concern for economic policy makers. On some occasions when housing bubbles have burst they have also been associated with significant disruption to the domestic financial system (e.g. in the mid-west of the US in the mid 1980s, in Scandinavia in 1989/1990 and today in the US, Spain and Ireland). Any such financial sector disruption greatly magnifies the macro-economic disruption which is caused by a housing sector collapse (Honohan and Klingebiel, 2003).

The analysis carried out in Girouard *et al.* (2006), indicates that when housing bubbles have occurred in the past they were essentially idiosyncratic in nature – they generally did not occur simultaneously across major regions of the OECD. The analysis in Himmelberg *et al.* (2005) also indicates that prior to the recent crisis there has not been a “US housing bubble” but rather a series of local bubbles in individual cities or regions in the US at different times over the last quarter of a century.

Until the current crisis there was little evidence that housing bubbles had become any more frequent over time and it is also interesting that, even with monetary union in the US, there had not, until now, been any obvious tendency for a “convergence” of bubbles within the US, much less in the EU. However, Girouard *et al.* (2006) suggest that global factors were important in continuing the housing boom across quite a number of markets in the period up to 2006 and this may explain why today there are

¹ This paper was prepared as part of an IRCHSS-funded project “Turning Globalization to National Advantage: Economic Policy Lessons from Ireland's Experience”. It has benefited from comments from colleagues, especially Ide Kearney and David Duffy, from Philip Lane of TCD, as well as participants at the June 2009 EUROFRAME conference in London and participants at a meeting of National Economic Research Organisations, OECD, Paris, September, 2009.

housing market crises in an unusually large number of EU members as well as in the US.

This idiosyncratic pattern reflects the fact that the drivers of housing prices are varied in nature and they include significant local or regional variables. Himmelberg *et al.* (2005) refer to the role of “superstar cities” where local circumstances can result in a prolonged period of higher than average growth in house prices.

The evidence suggests that until recently housing markets in the Euro area mirrored the pattern in the US, with some national markets showing very rapid inflation in asset values and others showing no inflation at all. While there is today some synchronisation across certain EMU members in their housing cycles, there is still very considerable diversity across the EMU. For example, in Ireland and Spain there is currently a major down turn in the housing market while in Germany and Finland there is no evidence of any major reduction in housing prices or output.

While housing market crashes in individual economies have generally not had global implications they have had very severe repercussions domestically. This is the case today in Ireland and Spain. It is important to understand what drives these housing markets so that future bubbles might be avoided. Because of the serious damage that housing crashes can cause to individual economies it will be important in the future to develop policy instruments to manage housing markets and to prevent dangerous bubbles occurring. While monetary policy is not a suitable instrument within EMU for this purpose because of the idiosyncratic nature of housing markets, this paper argues that fiscal policy instruments can achieve the desired impact if used in an innovative fashion.

In Section 2 of this paper the demographic factors that underpin long-term demand for housing are considered with particular reference to Ireland and Spain. This paper goes on in Section 3 to set out a simple model of the housing markets in Ireland and Spain. In the context of these models Section 4 considers how the advent of EMU has changed the cost of capital facing households and how this has affected the experience of Ireland and Spain in the current decade. Section 5 discusses the significance of the building sector in these two economies, an important factor in determining the macro-economic impact of a housing price crash. Section 6 discusses the implications of this experience for how housing markets should be managed in the future in EMU. Monetary policy, as implemented by the ECB, cannot be targeted at preventing dangerous situations arising in any individual regional housing market. The problem

that this poses for members of EMU is discussed, together with the appropriate fiscal strategy for managing potential regional bubbles. Section 7 presents conclusions.

2. The Drivers of the Housing Market – Demographics

The desired stock of housing in the long run in any economy is a function of permanent income, the user cost of housing, the cost of building, the availability of credit, local factors, and, crucially, the demographic structure. Because houses typically have very long lives and because demographic circumstances in individual economies change slowly the new build each year is typically a small proportion of the actual stock of dwellings. While the legacy effects of the destruction caused by the Second World War required major investment in the 1950s and 1960s, in many European countries this reconstruction work is long since completed. However, there may be issues for the new EU 12 member states related to the legacy effects of a half a century under communist rule. Today there are still significant differences in demography across the EU-15 which imply there will be regional differences in the demand for housing in the long-term.

Table 1: Dwellings per 1000 adults, 2001

	Total dwellings	Occupied dwellings
Denmark	621	595
Estonia	599	521
France	634	526
Germany	599	
Hungary	519	475
Ireland 2002	525	464
Ireland 2006	574	478
Netherlands		534
Poland	454	421
Portugal	634	448
Spain	655	444
UK	575	551

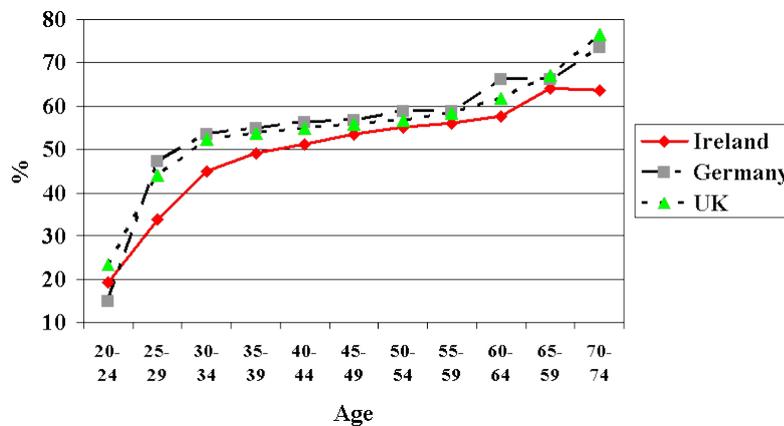
Source: EUROSTAT file cens_rdh for dwellings and EUROSTAT population file for population. Data for Ireland for 2006 are from CSO, *Census 2006*

Girouard *et al.* (2006) and ECB (2006) analyse the role of “fundamentals” in determining house prices. This research, and the research on individual EU economies (e.g. Duffy, 2002; Murphy, 2006 on Ireland, and Muellbauer and Murphy, 2008 for

the UK, Gonzalez and Ortega, 2009 for Spain), all indicate that while interest rates do affect house price inflation, it is only one of a range of driving variables. In the longer-term income growth and demographic change are very important drivers of changes in relative prices.

An important variable affecting the demand for new dwellings, and hence the investment in housing, is the existing stock of dwellings relative to the population. Table 1 shows the data for a number of EU countries for 2001, (and for Ireland for 2006) immediately after EMU began. For most of the EU 15 countries the stock of dwellings was high relative to the adult population (aged 20 and over) and had not changed much over the previous decade. This suggested that in terms of demographic factors these countries were close to their long run equilibrium stock. However, for Ireland, Portugal and Spain, when the ratio is calculated only for occupied houses, the stock is substantially lower relative to the adult population than for many of the other EU-15.²

Figure 1: Comparative Headship Rates



Note: Ireland, 2006, Census of Ireland, Germany, 1991 and UK 1992, Labour Force Survey.

If preferences for the standard of domestic accommodation are similar across EU populations this would suggest that, because of the fact that Ireland and Spain have only recently converged to the EU average in terms of income per head, their endowment of housing infrastructure may still be well below what might be expected for countries with their current standard of living. Given the slow adjustment of the

² For Spain the stock of “unoccupied” dwellings is very high because of the importance of foreign investment in dwellings purely for holiday purposes.

housing stock, it would take many years of above average investment in housing before the stocks in those countries will have reached the current levels in countries such as France, Germany, the Netherlands and the UK.

A measure of the difference in endowment is the percentage increase in the stock of dwellings that would be needed to raise the number of dwellings per adult in Ireland, Spain, and Portugal to the number in, for instance, France. Using this measure an increase in the stock of dwellings of roughly an eighth in each of these three countries would be needed to bring the endowment to French levels. For some of the newer EU member states the gap is much larger; for Poland the necessary increase would amount to almost a quarter of the existing housing stock.

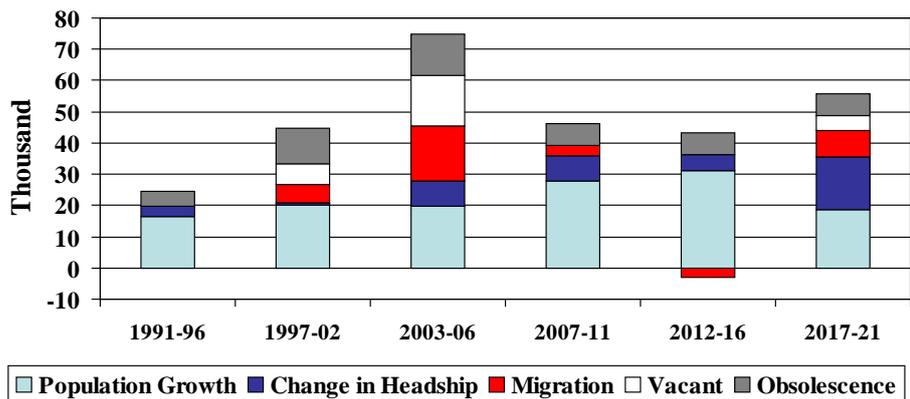
This difference in the endowment of housing infrastructure is also reflected in a difference in the proportion of people at each age group in Ireland who are heads of households relative to other EU countries, such as Germany and the UK. Figure 1 shows data for Ireland, Germany and the UK. For each five-year cohort it shows the proportion of the cohort who are heads of households.³ Obviously cultural differences, in terms of such factors as divorce etc., may affect the numbers of households. However, these data provide a useful indicator of the availability of dwellings. In spite of the relatively similar standard of living in the three countries the lower endowment of dwellings in Ireland means that adults have to share dwellings with their parents or unrelated friends under circumstances where adults in Germany or the UK would rent (or buy) their own apartment or house. This difference is particularly noticeable for those aged between 25 and 34. Garcia and Hernandez (2008) report similar circumstances in Spain where high prices have affected headship rates. They report that because of the high prices “This places an obstacle to the departure of young adults from the family home, delaying their emancipation age...”.

The very rapid rise in the cost of housing over the last decade in Ireland has meant that the headship rates did not change at a time when living standards, measured in terms of real disposable income, rose dramatically. This may also have been the case for Spain. Now that house prices (and rents) are falling it may be anticipated that individuals who are currently sharing accommodation will, at some time in the future,

³ Technically referred to as household reference person. In the case of Germany if there is a male in the household he is normally defined as the reference person. In Ireland and the UK it is nominated by the household and an increasing share of them are now women.

enter the housing market seeking to establish a new independent household. ⁴ This overhang of potential renters or buyers will mean that, after the current adjustment, investment in housing is likely to remain above the average for the EU 15 for some time to come in Ireland, Portugal and Spain.

Figure 2: Average Annual Demand for Housing in Ireland



Source: Bergin, *et al.*, 2009

Figure 2 shows a decomposition of average annual housing demand in Ireland since 1991 together with forecasts for the future illustrating the impact of demographic factors. At unchanged headship rates around 20,000 additional dwellings a year are needed to take account of the rising number of adults, especially in the younger age groups.⁵ Because of the rapid rise in the price of housing the headship rates, which are well below those in Germany and the UK, remained relatively unchanged over the 1990s. This reflected the rapid rise in the cost of accommodation which offset the effects of higher incomes. In addition, immigration has accounted for approximately 15,000 of the additional dwellings occupied each year between 2003 and 2006. This reflected the fact that many immigrants to Ireland are skilled (well

⁴ However, there is evidence that in spite of the very serious decline in the economy in 2008 the number of households showed a record increase in that year suggesting a rapid response of headship rates to a very big reduction in rents (Bergin *et al.*, 2009).

⁵ With a very small share of the population aged over 75 the numbers dying each year leaving dwellings vacant for the younger generation is low. In countries such as Germany the population is closer to demographic balance.

educated) and they have similar headship rates to natives (FitzGerald *et al.*, 2008). However, a very substantial share of the additional dwellings built between 2003 and 2006 were not occupied by permanent households. While some were built as holiday homes many of them were built for purely speculative purposes and the build up of the stock of vacant dwellings after 2003 presaged future problems in the housing market.

Both Spain and Ireland have a very small private rented sector with home ownership being the norm. In the case of Spain the home ownership rate in 2000-1 was 81 per cent.⁶ For Ireland it was around 75 per cent. The private rented sector was around 11 per cent in Spain and around 15 per cent in Ireland. This contrasts with home ownership rates in the UK and the US of just under 70 per cent and just over 40 per cent in Germany. This means that the private rental sector in both Ireland and Spain is very small and, as discussed later, this may have implications for the way the current adjustment to falling prices plays out.⁷

Spain is in a similar position to Ireland for dwellings that are permanently occupied. However, in the case of Spain what makes the position very uncertain is that a high proportion of the new build in recent years has been designed to satisfy demand from abroad for holiday homes. Some of these holiday homes are owned directly by foreigners and some are rented by Spanish owners (individuals or companies) to foreigners. While holiday homes are also a factor in the demand for housing in Ireland they have constituted a much smaller share of the demand than in the case of Spain. In the case of Spain the number of holiday homes or dwellings otherwise vacant is almost a third of the total stock whereas in Ireland it is around 15 per cent, still a relatively high number.

For holiday homes a range of additional factors are important. There are cultural effects, where changing preferences mean that people in Northern Europe favour holidays in the sun. In addition, the dramatic fall in the cost of travel has made frequent flights to Southern Europe affordable for many in countries such as Germany, the UK and Ireland.

⁶ Data from Garcia and Hernandez, 2008 and CSO: Census of Ireland, 2006.

⁷ According to the Irish consumer price index in April 2009 rents were down 13 per cent on April 2008.

Obviously, when a Dutch or a Swedish person chooses to buy an apartment in Spain it is their income rather than Spanish incomes that will be important. In addition, they have the option of funding the investment through local finance or through finance in their home country. However, in determining the user cost of such an investment it is the expectations as to property prices in Spain that matter rather than expectations of capital gains (or losses) in their home country.

Because holiday homes are a “luxury” it is to be expected that demand will be more volatile than in the case of demand for dwellings to live in. However, unless global warming changes the climate in the North Atlantic very rapidly, it is to be expected that there will be continuing long-term demand for new housing in coastal regions of the Mediterranean. There remains uncertainty about the phasing of that investment over time and the location of new development round the Mediterranean.

The data in Table 1 indicate that Poland has an even lower stock of dwellings per thousand adults than is the case for Spain and Ireland. In addition, in the case of Poland a lot of the stock of pre 1990 dwellings have major problems, in particular in terms of insulation. If Poland behaves in a similar manner to the converging EU-15 countries (Ireland, Greece, Spain and Portugal) there is likely to be significant demand for new housing in coming decades. While current low income levels relative to the EU average mean that priority is given to other forms of investment today, in the future rising incomes could see a major growth in demand for new housing. As in Spain and Ireland, managing these pressures in the future to ensure that the rest of the economy is not crowded out will be important.

3. A Model of House Prices

In this section we specify and estimate new house price equations for both Ireland and Spain. In both cases the equation for new house prices is based on the standard textbook model and consists of an inverted demand equation. This specification of the Irish and Spanish housing models draws on the work of Murphy (1998). In the textbook model house prices are determined by real disposable income, the per capita housing stock, a proxy for the user cost of housing (mortgage interest rate less the change in house prices) and the percentage of the population in the key household formation age group of 25-34 years. Other empirical studies including those by Kenny

(1999) and Roche (2001) have used similar specifications. The baseline equation for new house prices may be written as follows:

$$\begin{aligned} \text{Log}\left(\frac{PHNEW}{PC}\right)_t = & \beta_0 + \beta_1 \log\left(\frac{Y}{POP}\right) - \beta_3 \log\left(1 + \frac{HSTOCK}{POP}\right) \\ & + \beta_4 \left(\frac{POP2534}{POP}\right) - \beta_5(rr) \end{aligned} \quad (1)$$

The standard model does not include any variables capturing the effects of financial liberalisation on house prices. Roche (2003) and McQuinn (2004) use alternative versions of the standard model by including an average mortgage loan variable as a proxy for financial liberalisation. However Murphy (2006) has criticised the inclusion of the average mortgage variable as an explanatory variable on a number of grounds including the argument that the mortgage loan variable is not independent of house prices. In the absence of a reliable measure of financial liberalisation, we follow the approach of Murphy (2006) and include a dummy for 2003 which is designed to pick up “the combined effects of financial liberalisation, policy interventions since 1998 and speculative frenzy effects”.

In Equation (2) we apply the model to Irish data. Real new house prices (defined as new house prices (*PHNEW*) deflated by the personal consumption deflator (*PC*)) are modelled as a function of real disposable income per capita (*Y*), the housing stock (*HSTOCK*) per head of the total population (*POP_t*), the percentage of the population aged 25-34 years (*POP2534*) and the real cost of capital for housing (*rr*). A dummy variable is included for 2003 (*D03*)⁸. The user cost variable is calculated as the mortgage interest rate less the three period moving average of the rate of inflation in new houses⁹.

⁸ The dummy variable is set equal to zero up to and including 2003 and is set equal to one thereafter.

⁹ Real cost of capital for housing = $rr = \left[\text{nom.int.rate}_{t-1} - \frac{1}{2} \log\left(\frac{phnew_{t-1}}{phnew_{t-3}}\right) \right]$

$$\begin{aligned} \text{Log}\left(\frac{PHNEW}{PC}\right)_t &= 8.41 + 0.99 \log\left(\frac{Y}{POP}\right) - 3.79 \log\left(1 + \frac{HSTOCK}{POP}\right) \\ &+ 14.12 \left(\frac{POP2534}{POP}\right) - 0.97(rr) + 0.11(D03) \end{aligned} \quad (2)$$

The full estimation results are shown in Appendix 1. The estimated coefficients on the equation for new house prices show the expected signs. The coefficient on income measures the responsiveness of house prices to changes in income. The elasticity of .9 is high and suggests a high degree of pass through of changes in income to new house prices. The coefficient on the per capita housing stock variable is significant and negatively signed indicating the importance of a scarcity effect. This implies that Ireland's relatively low endowment of dwellings coupled with strong population growth in the 1990s was an important driver of house prices. The demographic variable is positive and significant indicating that the expansion of the key house buying population cohort contributed to the increase in new house prices. The coefficient on the real cost of capital is significant and correctly signed. The coefficient on the 2003 dummy is significant and may be picking up the combined effects of a more liberalised mortgage market, demand and supply side policy measures which drove up house prices and the speculative frenzy which accompanied the rapid appreciation in the value of new houses.

We next apply the standard housing model with some adjustments to the Spanish data and draw comparisons with the estimation results for Ireland. In equation (3) new house prices are a function of real household disposable income per capita (Y), the housing stock ($HSTOCK$) per head of the total population (POP_t), the percentage of the population aged 25-34 years ($POP2534$) and the real cost of capital for housing (rr). This mirrors the specification of Irish house prices in equation (2) and the standard house price model represented by equation (1). In addition two dummy variables are included for the years 1987 and 2003. The 1987 dummy is designed to capture the effect of Spain's accession to the EU which involved major liberalization in the Spanish economy, including changes in the financial system, while the 2003 dummy is included to pick up the bubble effect on house prices of the boom in the Spanish property market during the early 2000's. The full estimation results are shown in Appendix 1.

$$\begin{aligned} \text{Log}\left(\frac{PHNEW}{PC}\right)_t &= -6.71 + 1.13\text{log}\left(\frac{Y}{POP}\right) - 8.22\text{log}\left(\frac{1+HSTOCK}{POP}\right) \\ &+ 25.61\left(\frac{POP2534}{POP}\right) - 0.85\text{log}(rr) + 0.11(D87) + 0.27D(03) \end{aligned} \quad (3)$$

The estimated coefficients for new house prices in the equation for Spain show the expected signs, however the magnitude of the coefficients differ compared to results for Ireland. The estimation results for Spain show that a 1 per cent rise in real income per capita leads to a 1.1 per cent rise in house prices compared to a 0.9 per cent rise in Ireland. The housing stock per capita variable has a substantially bigger effect in the Spanish equation than in the Irish equation.

The estimation results for both Ireland and Spain show that the increase in the proportion of the population in the key household formation age group was an important driver of new house prices. A 0.01 unit rise in the household formation ratio leads to a 14.1 per cent rise in new house prices in Ireland and a 25.6 per cent rise in Spain. Lower interest rates also contributed to higher new house prices in both Ireland and Spain. The estimation results show that a one percentage point rise in the user cost variable leads to almost a 1 per cent fall in house prices in Ireland and a .9 per cent fall in Spain.

Faust et al (2001) have estimated a standard monetary policy reaction function for the Bundesbank based on a simple Taylor rule and have compared the ECB's actual monetary policy with the predictions from this reaction function, using Euro Area data. They find that ECB interest rates have been consistently below those predicted by the estimated Taylor rule. For Ireland Faust et al find that in 1999 had interest rates been determined by a Taylor rule the fitted target rate in that year would have averaged 9.2 per cent. This corresponds to a discrepancy of 6.4 per cent between the average predicted target rate and the actual rate that prevailed in that year. Applying this to the coefficient on the real interest rate in equation (2) this implies that had interest rates in Ireland been 6.4 per cent higher in 1999 this would have reduced house prices by around 6.2 per cent. For Spain Faust et al estimate that interest rates in 1999 would have been 4.7 per cent higher than the actual rate, using a Taylor rule. With an estimated coefficient of .85 on the real interest rate term in equation (3) this implies that house prices in Spain would have been reduced by a further 4 per cent had interest rates averaged the 7.3 per cent predicted by the Taylor rule rather than the

average actual rate of 2.8 per cent which prevailed at the time. This is a simple measure of the initial impact of EMU membership on the housing markets in Spain and Ireland.

Finally two time dummies are included in the Spanish model. The coefficient on the 1987 dummy indicates that house prices in Spain in that year were 10 per cent higher after taking account of the other variables in the model. The positive and significant coefficient on the 1987 dummy variable picks up the impact of Spain's accession to the EU in 1986.

As in the equation for Ireland the 2003 dummy is included in the Spanish equation to capture the combined effects of financial liberalisation, policy interventions and speculative frenzy effects which gave rise to strong growth in Spanish house prices post 2003 – behaviour that cannot be captured in a standard model of house prices. The effect of the 2003 dummy is to raise house prices by about 27 per cent above the level explained by the other variables in the model. Without a measure of financial liberalisation it is difficult to establish the precise effect of more favourable financial conditions on house prices in Spain. However, as for Ireland, the Spanish housing boom was undoubtedly propagated by a combination of a more liberalised mortgage market, policy changes and frenzy activity as reflected in the significance and magnitude of the dummy variables in both equation (2) and (3).

Overall the estimation results for Ireland and Spain indicate that fundamentals such as income, demographics, the size of the existing housing stock and the user cost of capital are crucial determinants of new house prices. In addition, the results suggest that other factors such as financial liberalisation and frenzy effects are likely to have raised the level of house prices above where they otherwise would have been, particularly in the period after 2003 when both countries experienced a housing boom.

4. The Cost of Capital

Prior to EMU there were substantial differences in the cost of capital facing householders across the EU. These differences in the cost of capital may have slowed investment in housing in some countries where they were relatively high. However, the advent of EMU substantially changed the expected cost of capital facing agents in many member states of the Euro area. It meant that there was substantial convergence in the nominal interest rate facing similar agents across the EMU. However, because

of continuing differences in the rate of inflation across the EMU real interest rates still differ for households.

EMU “liberalised” credit markets

The financial sector has undergone major changes over the last thirty years. This has involved both liberalisation and the changes consequent on the move to Economic and Monetary Union. These two developments have combined to provide a dramatically different environment today for households wanting to finance investment in housing compared to thirty years ago. In the 1970s many households in Ireland and Spain were credit constrained and were not able to finance their optimal level of investment in housing. However, it was not just the availability of finance that has changed but its cost has also been reduced by the move to monetary union and also by financial liberalisation in the 1990s and the early years of this decade. Worldwide lax monetary policy over the last decade reduced the cost of capital, not just in Ireland and Spain, but also for households in most developed economies. However, the advent of EMU as well as financial liberalisation potentially reduced the cost of finance by making available a much wider pool of savings without incurring exchange rate risk.

In the Irish case, up to the end of the 1970s all mortgage finance was provided by “building societies”. These financial institutions raised all their finance from deposits, generally by households. They were all mutual companies facing rather different incentives than private limited companies (that can be assumed to be profit maximisers). As a result, interest rates were not used as an instrument to clear the mortgage market and there was widespread credit rationing. In some cases the building societies operated queuing based on the length of time that a borrower had previously been a depositor.

Over the course of the 1980s the standard banking system moved into the mortgage market and building societies began to raise some of their funds from the interbank market rather than from small depositors. Also the building societies themselves moved away from the mutual model so that they had an incentive to use price (the interest rate) to clear the market.

There are a number of implications of these institutional changes. In the 1970s credit rationing was the norm in finance for housing. The interest rate was dependent on the availability of domestic savings and would have been little affected by exchange rate risks. The extent of rationing would have depended on the competition

for personal deposits and the demand for mortgages. However, over the course of the 1980s as the market liberalised and as financial institutions had access to the interbank market, the constraint on finance was relaxed. Instead the cost of finance was increasingly related to the cost of funds on the local interbank market.

Table 2: Excess Returns from Borrowing in DMs and lending in local currency

	1980-1998	1985-1998
Ireland	2.0	1.6
Spain	1.4	1.9
UK ¹⁰	2.1	

The Impact of EMU – nominal interest rates

One of the key long-term reasons why membership of EMU was considered desirable for Ireland and many other potential members was the expected impact on interest rates and the cost of capital (Baker, Fitz Gerald and Honohan, 1996, Calmfors, 1997). For countries such as Spain, Ireland, and the UK, historically there had been a significant risk premium attaching to borrowing in their own currency relative to borrowing in DMs. Table 2 shows a measure of the risk premium, the excess returns for governments from borrowing in DMs and lending in the local currency, for two time periods, 1980-1999 and 1985-1999. This is calculated using medium-term government bonds – it is the risk premium that faced the government sector. The advent of EMU saw such differentials between yields on government bonds almost disappear. However, over the past year the differentials have again reappeared in a dramatic form as a consequence of the current financial crisis and the differing exposure of different countries to its consequences.

Thus for most of the member governments, as expected, the advent of EMU substantially reduced the cost of capital. This had a very striking positive impact on the public finances for countries that were heavily indebted, especially where the debt was financed on a short to medium term basis – Italy. The notable exception to this was Germany which had experienced a lower real cost of capital for some considerable time.

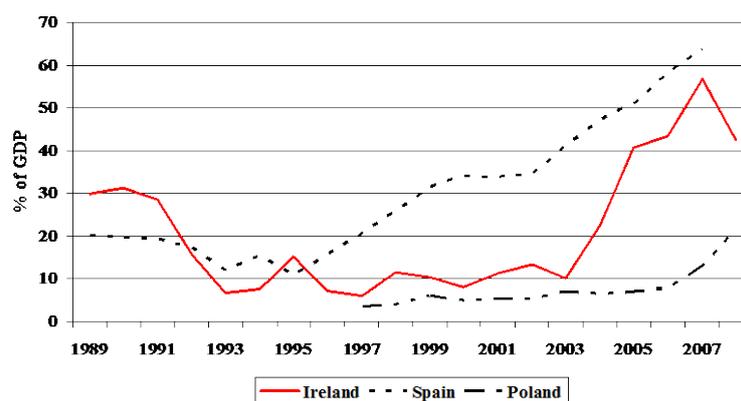
¹⁰ For the UK it is 1979-1998.

Multinational firms trading on the world market always had the opportunity to borrow in DMs, availing of the lower cost of finance. With diversified trade such firms could also hedge their currency risk within the firm itself, availing of the lowest available cost of finance internationally. In recent years, with financial liberalisation, many commercial firms in the EU also had access to financial instruments which allowed them to hedge some of their foreign currency risk at a price. This meant that for multinational firms the cost of capital was probably lower than for firms trading purely on the domestic market. This would suggest that the benefits of a reduction in nominal interest rates as a result of EMU, while significant for the company sector, were probably greatest for smaller firms.

For much of the private sector borrowing in the local currency in Ireland, Spain and elsewhere a significant exchange risk premium was payable prior to EMU as a cost of having an independent currency. This meant that the cost of capital for housing in such countries had been substantially greater than that for households in Germany and other countries where interest rates were broadly related to the DM. As this difference in the cost of capital had persisted over a long period it meant that prior to EMU, even with similar income levels and demographics, the optimal long-run stock of dwellings would have been lower than in Germany or the Netherlands. The advent of EMU, reducing the cost of capital permanently for households, will have raised the optimal long run stock of dwellings.

In addition to the interest rate premium payable by the household sector in Ireland and Spain prior to EMU, there was a further factor that is difficult to quantify, but which affected the availability of capital to fund housing investment. In the case of both Spain and Ireland we have seen in recent years that the surge in investment in housing has had its counterpart in a major increase in the balance of payments deficit. In turn, this deficit has been partially financed by the financial system borrowing abroad to onlend to the domestic household sector to fund their housing investment.

Figure 3: Net Foreign Liabilities of Banking System, Ireland



Prior to EMU the cost of funds on the Irish or Spanish interbank markets was affected by the supply and demand for funds in Ireland and Spain and the cost of foreign exchange. As discussed above there was a significant risk premium attached to lending in local currency relative to lending in DMs. Where traditional banks and building societies could fund their mortgage lending from local deposits the situation may have been similar in character to that in the 1970s and the 1980s. However, where the financial system was borrowing abroad to fund its lending, the exchange risk involved would have been passed through to borrowers. This would have involved both higher interest rates and the possibility of increased volatility.

Figure 3 shows the net foreign liabilities of the domestic financial system in Ireland, Spain and Poland relative to GDP. Over the last decade the housing booms in both Ireland and Spain relied on the availability of a ready supply of bank credit in the form of mortgages. If banks had behaved as in the 1970s and the 1980s they would have rationed mortgages while relying purely on domestic funds. To some extent this “rationing” might have shown up in an increase in the domestic interest rate unless monetary policy had proved accommodating. However, the liberalisation of the banking systems meant that banks were not constrained by their domestic deposit base, or even by the availability of funds on the local market.

As discussed above, in the 1980s and the early 1990s external borrowing by the domestic banking system would have involved a substantial foreign exchange risk premium. If banks had had to have recourse to this source of finance they would have been forced to pass on the cost of this premium to their customers. The resulting rise in interest rates would have slowed, if not choked off the housing booms in both

countries at an early stage. Such an outcome would also have prevented the housing booms reaching the level they did in both Spain and Ireland.

Instead, with the advent of EMU (and prior to the financial crisis), the domestic banking systems in both Ireland and Spain were able to raise substantial additional resources without any exchange risk and this provided the financing for a very large continuing investment in new building in both economies. In the case of Ireland this increase occurred very rapidly from 2003 onwards. With the collapse in house building in the Irish economy in 2008 (and in investment generally) the banks have begun the process of reducing their foreign borrowing.

The path of liberalisation of the Spanish financial system is rather different from that for Ireland. However, the 1990s also saw the development of a liberalised regime with a move away from credit rationing, as well as the move to EMU membership at the end of the decade.

The situation in Ireland and Spain in the period to 2008 was that banks had to raise very substantial funds abroad to finance the domestic housing boom. This was reflected in the dramatic rise since 2003 in the net foreign liabilities of the Irish domestic banking system shown in Figure 3. Because the funds are being raised in euros and the banks liabilities are also denominated in euros there is no exchange rate risk. In addition to raising additional funds on the Euro market, prior to the credit crisis it proved possible for banks to securitise mortgages and sell them on to the European market, reducing their exposure to the domestic market and raising additional funds to either finance more mortgage lending or investment in other assets.

The effect of EMU membership has thus been to reduce the financing costs for households engaging in a huge investment programme in domestic housing in Spain and Ireland. Prior to EMU such a boom would probably have fizzled out at a much earlier stage as banks faced an ever rising cost of funds, costs which they would have had to pass on to customers.

However, while EMU played a very important role in relaxing the constraints on the banking systems in Ireland and Spain the importance of the wider integration of financial markets should not be underestimated. The low cost of finance world-wide not only affected the Euro area but also the other members of the EU. As shown in Figure 3, Poland, while not a member of EMU saw a rather similar process, though on a more limited scale, where domestic banks borrowed abroad to fund domestic

investment. However, unlike in Ireland, much of this funding may have been sourced within individual banks from their parents in Austria, Italy or Scandinavia. Nonetheless whatever the immediate source of the funds it did allow housing investment to expand in Poland.

A substantial part of this lending in Poland and Hungary took place in foreign currencies, especially Euros and Swiss Francs (Pawlowski, 2006). While this provided funding for housing to the household sector at a low nominal interest rate it also transferred the related exchange risk to those households. The fact that this source of funding was available at a low nominal interest rate in Poland (and other EU members not part of the Euro area) suggests that even without the advent of EMU, financial liberalisation could have still allowed significant housing booms in Ireland and Spain over the last decade.

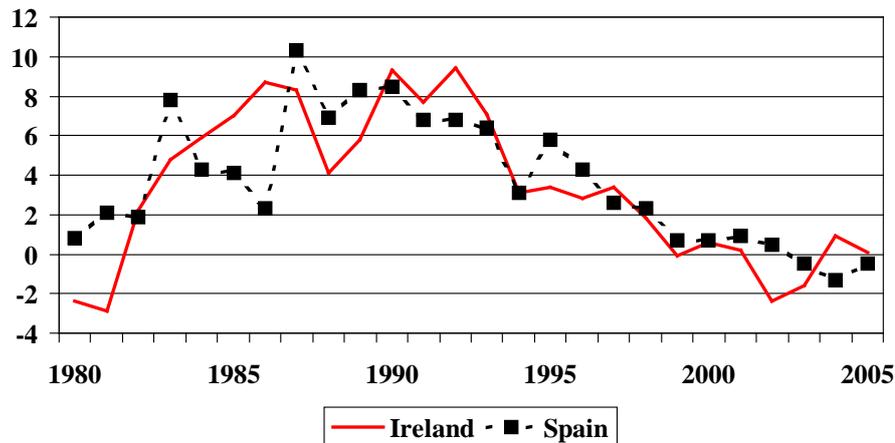
The Real Cost of Capital

For firms selling their goods on the world market, whose output price is set on that market, the appropriate price deflator to use in calculating the real rate of interest is their output price. As a consequence differences in domestic inflation rates do not necessarily affect their cost of capital. Thus where a firm manufacturing cars in Spain, sells those cars at a price determined on the EU market in Germany, the Spanish rate of inflation in consumer prices does not directly affect its real cost of capital. Within EMU, with similar nominal interest rates across all EU members for similar firms the cost of capital for such firms is, as a result, independent of their location within the EMU and of the local rate of inflation in consumer prices.¹¹

However, for the household sector the appropriate price deflator is that for personal consumers' expenditure. As shown in Figure 4, in both Ireland and Spain real interest rates for households were very high in the early 1990s. However, with the approach of EMU real rates began to fall rapidly. While EMU was the major factor in the fall in interest rates, developments in global financial markets also played some role.

¹¹ Obviously higher rates of inflation in consumer prices may translate into growing labour cost differentials which would differentially affect firms in different countries in the EMU.

Figure 4: Real Interest Rates in Ireland and Spain



While EMU brought about a substantial reduction in the real cost of capital for households in many member countries, this reduction was particularly marked in the case of Spain and Ireland. With much higher rates of inflation in consumer prices in Ireland and Spain over the course of the first decade of EMU the real interest rate faced by the household sector in those countries was much lower than in Germany or France. In turn, this encouraged further investment in housing, adding to the pressure on the labour market and, ultimately, domestic consumer prices.

In addition to the reduction in the real interest rate for households, EMU made it much easier for the domestic financial system to fund a major investment surge by households. The fact that this change occurred as a result of a regime change (EMU) meant that it was perceived as a permanent reduction in the cost of capital raising the optimal long run stock of housing. When combined with the lower endowment of dwellings in Spain and Ireland it is not surprising that there was a strong impact on the housing sector.

5. The Role of Building in the Economy

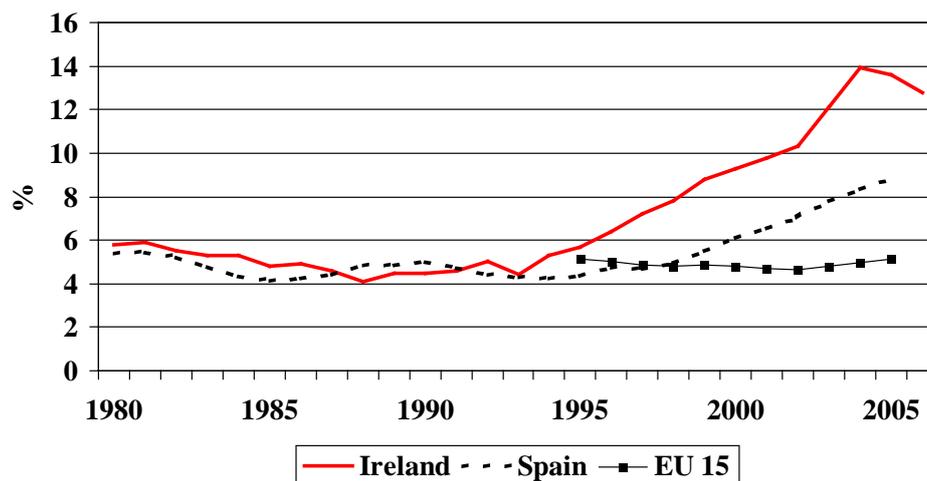
The building and construction sector, and housing in particular, accounts for very different shares of the economy across EU member states. For those economies such as France and Germany, where the housing stock appears to be close to its long-term equilibrium, investment in housing accounts for around 5 to 6 per cent of GDP (Table 3). The average for the US is under 5 per cent. Over the last thirty five years, while there have been fluctuations in the share of housing investment in GDP, the difference in share between peak and trough has been between 3 and 4 percentage points of

GDP. This actually exaggerates the extent of the cyclical fluctuations for these countries as the peak occurred in the 1970s and the trough in the last decade. For the UK, housing investment accounts for an even smaller share of GDP. In the case of France and Germany, their recent investment in building and construction, expressed as a share of GDP, has been below the average for the last 35 years (Table 3). For the UK it has been slightly above the average, though well below the highest levels achieved in the past.

Table 3: Housing Investment as a share of GDP, 1970-2005, per cent

Share of GDP	Housing				Other building			
	Average	Maximum	Minimum	2005	Average	Maximum	Minimum	2005
France	5.4	7.9	4.1	4.6	5.8	7.6	4.1	5.1
Germany	6.5	8.2	5.2	5.6	6.6	10.0	3.8	3.8
UK	3.6	4.5	2.8	3.9	5.2	7.0	4.3	5.0
Ireland	6.1	13.9	3.7	13.9	6.0	8.6	4.0	6.0
Spain	5.4	8.9	4.1	8.9	7.3	9.2	6.2	8.3
Poland, 1996-05	2.6	3.0	2.2	2.7	8.8	10.6	7.6	7.6

Figure 5: Housing Investment as a % of GDP¹²



The fact that housing accounts for a limited share of GDP does not prevent bubbles in house prices from occurring or from affecting aggregate economic activity through wealth effects but it does limit the direct effects of the housing cycle on aggregate demand. In the UK, in spite of the small share of economic activity accounted for by housing investment, it has suffered two cases of house price bubbles bursting in the last 20 years – one around 1990 and the second that is currently taking place.

In the case of Ireland and Spain the situation is very different, with the difference between the highest and lowest share of housing in GDP in Spain being just under 5

¹² In the case of Ireland it is as a percentage of GNP.

percentage points of GDP and a massive 10 per cent in the case of Ireland. In the case of both of these countries housing investment in 2006 accounted for a record share of GDP (Figure 5). This peak in activity is not just a cyclical event – the share of GDP accounted for by housing investment has been well above the previous levels over the past decade in both these countries reflecting both the demographic factors discussed above and also the changed circumstances of EMU. These two economies could not continue allocating such a high share of economic resources to this form of investment indefinitely.

The housing price and output booms in Spain and Ireland had a major impact on both these economies. To allocate such a high share of national resources to investment in housing, a major redeployment of resources was needed into the building and construction sector. High prices for housing and the enhanced profitability of the building sector resulted in a major expansion in activity, requiring a dramatic increase in the labour force employed in that sector. This bid up wage rates in the sector relative to the levels they would otherwise have maintained. In turn this attracted labour from other sector of the economy.¹³

While a significant part of the additional labour force in building and construction in both Ireland and Spain came from returning emigrants (in the case of Ireland), or from immigration in the case of both countries, there was, nonetheless, a major impact on the domestic labour market. At the peak approximately 20 per cent of employees in building and construction in Ireland were immigrants whereas the share in the late 1990s would have been close to zero. While this influx of labour moderated the impact on wage rates, it was not sufficient to offset the huge stimulus to the domestic labour markets in the two economies. The result has been that wage rates throughout the two economies rose much more rapidly than in the rest of EMU so that both economies lost competitiveness (Duffy et al., 2005).

The result of this demand shock has been that the tradable sector, in both Ireland and Spain, has been “crowded out” by the building and construction sector. Both countries have seen a rapid decline in market share for their exports and the result has

¹³ For example, in Ireland there has been a dramatic shift in the numbers training as engineers with the number of civil engineers growing dramatically and the number of electrical and electronic engineers falling. The reduced supply of electrical engineers, in turn, puts upward pressure on wages affecting sectors of the economy not involved in building and construction.

been a rapidly rising balance of payments deficit. This process is very similar to that where a major expansion in the public sector crowds out the (tradable) private sector. This process is described in Blanchard, 2007 where he illustrates the potential problems caused by this crowding out and concludes that government action may be required to moderate this process even in a perfect market (Blanchard, 2007).

This development would not necessarily have been very serious if the reallocation of resources to the building and construction sector were permanent. However, as argued above, the reallocation was essentially temporary due to a “catching up” in the stock of dwellings. If the catch up had been better managed by the respective governments so that it took place over a longer time scale then the reallocation of resources would have been more limited and the period for which the resources would have been utilised in the building and construction sector would have been much longer. As it is, the collapse in housing output in Ireland and Spain is releasing major resources, especially labour, resulting in a very rapid rise in the unemployment rate. However, while many firms in the tradable sector were forced to shut down due to their loss of competitiveness over the last five years, it will be quite a number of years before the labour market adjusts to restore competitiveness. Even then it will be some time before domestic output of tradables adjusts to fill the gap¹⁴.

As the adjustment continues, the balance of payments deficits in both countries can be expected to fall. However, in the case of Spain it is to be expected that in the long run there will be a continuing significant balance of payments deficit. Because so much of the demand for housing in Spain is for holiday homes and because many of these are bought by foreigners, the resulting capital inflow could sustain a substantial deficit over a prolonged period. While sales of holiday homes to foreigners are treated as a sale of an asset they are very close to being a tradable commodity. It is possible, if the market so desires, to build holiday homes very densely in large numbers for the foreseeable future – there is not a fixed supply of assets. This makes this market sustainable. The case is rather different for Estonia where much of medieval Tallinn has been sold to foreigners. As it takes a millennium to build a medieval dwelling such a flow of inward investment is not sustainable.

¹⁴ Bergin *et al.*, 2009)

With approximately a third of Spanish dwellings being holiday homes they are financed by a substantial capital inflow. If all of these homes were owned and financed by foreigners (a considerable exaggeration) this would mean that the capital inflow related to such transactions would amount to one third of the investment in housing – around 3 per cent of GDP in 2006. Unlike investment in financial assets such investment in property is fairly illiquid which means that there is little danger of a reversal of the capital flow (though of course the inflow can dry up). In reality the capital inflow is probably less than this but it is still significant and must be taken into account in considering the size of the Spanish balance of payments deficit and its long-term sustainability.

Because of the size of the housing sector in Ireland and Spain the magnitude of the potential contraction is also very large. Whereas in the US and the UK a housing bust could see the fall in domestic demand directly caused by the contraction in housing amounting to two or at most three percentage points of GDP, in Ireland and Spain the potential contraction could amount to between 5 and 10 per cent of GDP.

The experience of Ireland and Spain holds out important lessons for other governments: there is a need to manage domestic housing markets using fiscal policy and financial regulation. For example, Poland currently has a low endowment of housing and is devoting a small share of national resources to new investment in the sector. This is not surprising. However, with rising incomes, financial liberalisation and membership of EMU Poland would be ripe for a housing boom. If not managed appropriately this could pre-empt resources needed for more productive uses as it has done in Spain and Ireland.

Chauvin and Le Bayon (2005) considered the housing markets in Spain, France, the UK and the US. Their conclusion was that of those four countries only in Spain was there a risk of a housing bubble. FitzGerald *et al.*, 2005 warned of the dangers of a housing bust in Ireland and modelled the possible impact of such an event. Cameron, et al (2006) reached a rather different conclusion for the UK suggesting that a significant risk of a bubble existing in that economy. Rae and van den Noord (2006), looking at the Irish economy suggested that house prices were significantly above their equilibrium level. In EUROFRAME-EFN, 2006, the exposure of the Irish and Spanish economies to shocks was considered. It was suggested in that report that in the case of both economies there was a risk of a housing bubble.

Throughout 2006 house prices continued to rise in Ireland, Spain and the UK and the building construction sector continued to increase its share of economic activity in the former two countries putting pressure on the tradable sector. As we know now the bubble has burst in all three economies (as well as in the US). The question is now what the impact of this will be on those economies and how long it will be before they return to “normal”.

Table 4: International Experience of Real House Price Falls

	Maximum Fall in Price
Denmark	-37
Finland	-50
France	-18
Germany	-15
Ireland ¹⁵	-27
Netherlands	-50
Sweden	-38
United Kingdom	-34
United States	-14

Source: OECD, 2005 Economic Outlook, No. 78, November.

In all three economies the turning point came when potential buyers lost confidence in the prospect of future capital gains and stopped buying. The result was a fall in price and with the prospect of further falls in prices the user cost of owner occupation rose very rapidly. In turn, the building industry itself reacts with a significant lag so that output continued high in 2007. It is really only in 2008 in Ireland that the output of the sector began to show major adjustment.

What is interesting about the Spanish and Irish cases (and it is also true of the US) is that the bursting of the bubble was not caused by uncertainty in the financial markets but had a domestic trigger which changed agents expectations about future capital gains. Of course in the US it was the downturn in the housing market which caused (rather than was caused by) the financial dislocation that is so troubling the world economy. In the case of Ireland and Spain there is also very significant fall-out for the financial system from the burst property market bubble. In the case of the Irish financial system there was no exposure to toxic US assets. Instead the overexposure to risky domestic lending for property development has precipitated a major domestic financial crisis.

¹⁵ In Ireland the fall in real house prices was experienced between the third quarter of 1981 and the second quarter of 1987.

Table 4 shows the maximum falls in price that have occurred in the past in a sample of OECD economies when local housing bubbles burst. The largest falls experienced in the past were in Finland and the Netherlands where prices fell by 50 per cent. In quite a number of cases, including Ireland and the UK, the previous largest falls were of the order of 30 per cent. Past experience cannot tell us what will happen this time around in Ireland, Spain and the UK but it is a guide to the fact that the falls may be very significant (Kelly, 2007).

In the case of Ireland Van den Noord (2006) suggested an overvaluation of 15 per cent. Fitz Gerald et al., 2005, considered the potential for a fall in nominal house prices in Ireland of a third. However, while the equilibrium price might be 15 per cent (or even 30 per cent) below its peak level in 2006, prices may initially fall further than that. They will continue to fall until buyers are convinced that they can go no further down. As buyers return to the market they may then raise prices, which, by holding out the prospect of potential capital gains, in turn, reduces the user cost of housing thereby stimulating the market. Thus it is very difficult to forecast the trajectory of prices towards a new equilibrium as a bubble bursts.

The potential effects on Ireland of the housing bubble bursting were considered in detail in Fitz Gerald, *et al.*, 2005. Since that analysis was carried out the housing sector continued to expand for one further year, buoyed up by inappropriately stimulatory government policy. Thus the potential fall in output could be larger than that work envisaged. However, it does give a reasonable quantification of the potential impact of the bursting of the housing bubble on the economy.

However, for both Spain and Ireland the bursting of the property market bubble has coincided with the world recession and this has greatly aggravated the effects on the two economies. In the case of Ireland the cumulative fall in GDP over the period 2008-10 is expected to be around 12 per cent (Barrett *et al.*, 2009) while the fall in Spain could be of the order of 3 per cent (Holland *et al.*, 2009). Rising unemployment will result in a major slowdown in the rate of increase in labour costs, especially in Ireland. (Current forecasts using a model of the labour market suggest that nominal wage rates could fall by 7 per cent between 2009 and 2011, Bergin *et al.*, 2009.) If such an adjustment in labour costs does take place it will eventually result in an expansion in the tradable sector of the economy as exports rise consistent with a more competitive environment. However, there is likely to be a major permanent reduction

in Irish output as a result of the combined impact of the bursting of the property market bubble and the world recession.

In terms of the macro-economic dislocation consequent on the bursting of the housing bubble, a very important factor will be how long the adjustment to a new equilibrium takes. Typically, in the OECD area it takes between one and two years for sellers to accept a fall in real house prices of 10 percentage points (Kelly, 2007). This would suggest that if nominal house prices were to fall by a third relative to their peak in Ireland it could take between three and four years.¹⁶

The longer drawn out the adjustment process the greater the economic cost. While sellers refuse to contemplate a major fall in price and potential buyers hold out of the market there is no incentive for anyone to build more dwellings. In addition, all the businesses which are closely allied to the housing market (mortgage lenders, lawyers, estate agents, suppliers of furniture etc.) experience a dramatic downturn in activity. If sellers could be persuaded to adjust their expectations much more rapidly, so that prices find their long-term equilibrium level, the housing sector would see an earlier return to “normal”. In the case of the UK today the adjustment of expectations seems unusually rapid, which may hasten the end of the crisis. In Ireland house prices seem to be falling at the rate of around 10 per cent a year.

Another measure of the extent of the adjustment needed is the excess stock of unoccupied dwellings. It is difficult to estimate such a number but it is clear that there is a build up in stocks of finished dwellings in both Ireland and Spain. Until these dwellings are filled through renting or sale to new households there will continue to be downward pressure on the market. In both countries the demographics mean that there will be a continuing rise in household numbers in spite of the slowdown. Thus, even with inertia, the excess stock will be gradually eaten away. However, it is likely that the dynamics of the market will produce a somewhat faster resolution.

Pressures from the banking system to see an immediate return on the assets has resulted in a significant part of the excess stock being put on the rental market. There is strong evidence that this is happening with a consequential major reduction in rents. As outlined earlier, the rental market is very thin in Ireland and Spain and such an outcome would have a major initial downward impact on rents. Already renting is

¹⁶ This takes account of the underlying rate of inflation in the economy.

more attractive than purchase at current house prices. With rents falling and no prospect in the next year of a rise in house prices there is every incentive for households to rent rather than buy. However, the fall in the cost of housing will result in a rise in demand. In particular, the much lower headship rates in Ireland and Spain than might be expected means that there is considerable scope for headship rates to rise. Bergin *et al.*, 2009, suggests that this is already happening in Ireland in spite of the rising unemployment rate. Once the non-housing economy shows signs of recovering there could be a rapid take-up of “surplus” rented dwellings and a move by Irish and Spanish households to a more “European” rate of household formation.

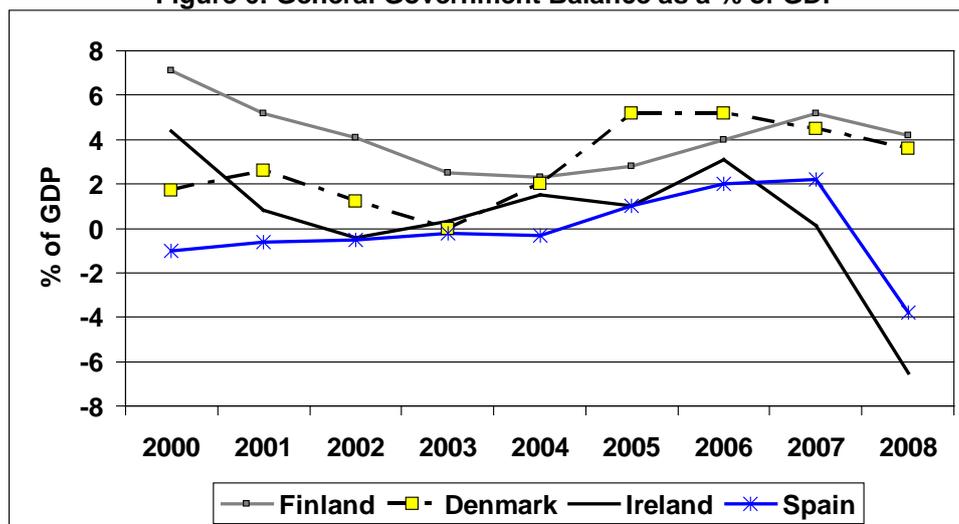
6. Managing the housing market under EMU

Since the mid-1990s there has been considerable debate about how fiscal policy should be used within EMU (Butti *et al.*, 2003). A lot of attention has been given to the Stability and Growth Pact (SGP) and the need to prevent government deficits exceeding 3 per cent of GDP. However, much less attention has been given to how fiscal policy should be used to manage individual regional economies. In particular, the potential problems that may arise for regional economies in EMU from local asset market bubbles, primarily in property, have not received much attention. We know now that the costs of failing to control such phenomena are very high and can be magnified by the damage done to the regional financial system.¹⁷

Generally, where substantial bubbles do occur they are reflected in a significant balance of payments deficit. In the case of Spain the rising balance of payments deficit goes back to the early years of EMU whereas for Ireland it only manifested itself in the last five years. In both cases the balance of payments deficit was a symptom of the domestic crowding out of the tradable sector due to the dramatic increase in building activity beyond its sustainable level. The consequence was a rapid rise in domestic costs, pricing the tradable sector out of its world markets.

¹⁷ The potential damage done to regional economies from bursting property market bubbles is also significant for regions in the US. However, in the US the attention has focused more on using financial regulation rather than fiscal policy to manage property markets.

Figure 6: General Government Balance as a % of GDP



Source: AMECO database

Looking at Ireland and Spain in 2001, Blanchard, 2001, suggested that significant balance of payments deficit then apparent in Spain suggested a need to tighten fiscal policy whereas for Ireland, running a balance of payments surplus, a real appreciation of the exchange rate was appropriate. However, on this basis, as Ireland moved into balance of payments deficit in 2003, a similar prescription would have been appropriate. While both countries complied with the rules of the Stability and Growth Pact running small surpluses this was not adequate to protect their own economies from the risk of overheating. Instead what was required was a policy similar to that adopted in Scandinavia where fiscal policy ran a substantial surplus preventing serious overheating. Figure 6 shows the general government balance in Ireland, Spain and Finland in recent years. As a result of a more prudent fiscal policy Finland now finds itself better equipped to face the current economic crisis. Thus within EMU it may be prudent for countries to run substantial surpluses for a number of years where domestic inflationary pressures are posing problems.

While EMU may not make an EMU-wide housing bubble any more likely, the restriction on the use of the interest rate to manage the domestic housing market increases risks from housing shocks for individual economies. As a result, monetary policy, which was potentially an effective tool for managing national housing market is no longer available for that purpose. There are, therefore, concerns, that the authorities in individual countries such as Ireland and Spain are handicapped in managing potential risks to their economic stability arising from housing market

developments. However, there are other instruments available to governments in EMU to achieve the same effect. The problem is just that they have not been used.

In preparation for possible membership of EMU the management of the housing sector was considered by the British Treasury in a document published in 2003 (Treasury, 2003). They considered that the loss of the interest rate instrument would obviously restrict the scope for economic policy to manage this important sector of the economy. They suggested that policy makers would have to make more active use of fiscal instruments, specifically taxation, to manage risks to the wider economy arising from possible housing bubbles. In particular, they suggested that stamp duty (a transactions tax) could be used to temporarily change the cost of housing investment for households. Fitz Gerald, 2001, suggested reducing income tax allowances for mortgage interest payments or even a tax on mortgage interest payments.

In each case the effect of the tax instrument would be to raise the cost of borrowing or financing housing investment, tending to reduce demand pressures and, hence, prices below the level they would otherwise reach. As outlined in the model in Section 3, by raising the cost of capital such a tax would exert significant downward pressure on house prices. Through its effect on the income of potential borrowers it would also tend to reduce demand pressures. Of the alternatives the taxation of mortgage interest payments may be the best instrument to use. In increasing the current outgoings of households it would reduce their ability to take on debt. As a result, when the danger of a bubble is over and the taxes are abolished or reduced, households would end up with a lower stock of debt for the same stock of housing. However, adopting such targeted fiscal policy instruments may be difficult to explain to a wider public.

Within the Euro area the risks to the financial sector from any potential, housing bubble depend on the extent of the regional banking system's exposure to the regional economy and its exposure within that economy to the housing (property) sector.¹⁸ Because of the fact that housing bubbles are essentially regional in nature, the more geographically diversified the financial system is the more robust it will be in the face

¹⁸ Here we are only considering the direct exposure of the regional banking system to the local market. As we have seen the exposure of the European banking system to the US sub-prime market was very substantial. This risk transfer occurred through the use of complicated financial instruments. The regulation of such instruments is a separate issue not considered here.

of idiosyncratic shocks. However, it is important for the regulatory authorities when stress testing their financial systems to take account of both the regional diversity of a bank's loan portfolio and also to take account of the possible wider economic consequences of a housing bubble. In particular, when housing bubbles burst they tend to be associated with much wider macro-economic disruption, which is likely to affect employment and output levels.

A serious shock to the agricultural, energy and regional property sectors in the Federal Reserve of Kansas City District in the US in the mid-1980s caused many local banks to fail.¹⁹ As a result of this experience the local Federal Reserve Board advocated greatly increased securitisation of mortgage debt in its *Economic Review* in subsequent years. This was designed to reduce the vulnerability of the local financial system, which was very exposed to the regional economy (due to lack of regional diversification due to the operation of the Glass-Steagel act). However, we have seen the dangers that securitisation can bring: the securitisation of mortgage assets in the US spread the risks of a housing bust far and wide. This highlighted the fact that securitisation is only as good as the original mortgage assets and we have seen that in the case of the US these assets were not very good! However, if properly regulated such instruments may still prove important in reducing risks where banking systems are regional in nature.

The financial regulatory authorities in individual regional economies can play a vital role in ensuring the financial stability of their financial systems. If more attention had been paid to the threats to financial stability in Ireland the problems today would be much less acute than they actually are. However, in a financially integrated world, where banks operating in an individual economy are regulated by different national authorities, it may not be feasible to manage the domestic housing market merely by better financial regulation. In the case of Ireland, even if the domestic regulator had acted sensibly, limiting the exposure of the domestic financial system to the domestic housing market, this would not have prevented foreign owned banks from providing excessive credit. The only comprehensive instrument available to the government was fiscal policy.

¹⁹ 63 banks failed in the region in 1985 and 69 in 1986, Keeton and Hecht, 1987.

Outside the Euro area, in particular in Poland and Hungary (see EFN, 2006), the potential risks to the economy from a housing boom are being enhanced through the move to borrowing in euros or Swiss francs. Such borrowing by households in foreign currencies was previously a factor in the financial crisis in Scandinavia in the early 1990s (Jonung, Kiander and Vartia, 2008). This pattern of behaviour makes these economies vulnerable to exchange rate shocks and it could also see the costs to the economy of a normal adjustment process after a macro-economic shock, involving changes in exchange rates, being greatly magnified through the direct effects on the net asset position of households.

The experience of the past, both in the US and in Europe, indicates that there is a little danger of a Euro-wide housing bubble posing problems for policy makers in the near future. However, regional booms and busts can and are happening and past experience indicates that they have serious implications for the regional economies so affected. In addition, problems in the housing market can affect the regional financial sector where problems of bad debts occur. This emphasises the need for the authorities in individual EU member states to use fiscal policy actively to prevent bubbles occurring. They also need to improve their regulation of their domestic financial systems to discourage banks from taking excessive risk which endangers the economy as a whole as well, of course, as the individual banks' well-being.

7. Conclusions

Prior to EMU member states had the opportunity to manage the domestic housing market through monetary policy. However, under EMU monetary policy is targeted at the Euro area inflation rate and, because of the idiosyncratic nature of the housing sector across the Euro zone, the stance of monetary policy will only help control housing bubbles by accident.

Under these circumstances the best instrument available to governments to manage regional housing markets is fiscal policy. Through suitably targeted tax instruments the authorities can change the cost of housing services faced by households, influencing their investment behaviour. Using this instrument effectively may prove politically difficult, partly because of its novelty. However, as housing bubbles are as likely to happen in the future as in the past, it will be important for governments to develop an understanding of the potential dangers of shocks in the housing sector to

the wider economy and of the implications of EMU for how the housing market must be managed.

In addition, the advent of monetary union has not absolved governments from the duty to manage domestic inflationary pressures using fiscal policy. Instead of focusing on the SGP target of “not running a deficit” it may instead be appropriate for some countries to run substantial surpluses for a period of years.

A second important implication for policy is the need for the regulatory authorities to take appropriate measures to safeguard their domestic financial sectors. In stress testing the financial system they need to take account of the likelihood that macro-economic shocks may affect all economies within the EMU. Such shocks, whether or not they are combined, with a rise in real interest rates, may seriously affect the housing sector. While shocks to the housing sector are most unlikely to be generalised across the Euro area, they may affect a number of regional economies simultaneously, such as in Scandinavia in the late 1980s and early 1990s. Under these circumstances the robustness of individual bank’s loan portfolios needs to be tested by shocks which might simultaneously affect a number of the markets in which the individual banks trade.

References

- Baker, T. J. Fitz Gerald and P. Honohan, 1996, *Economic Implications for Ireland of EMU*, Policy Research Series No. 28, The Economic and Social Research Institute, Dublin.
- Barrett, A., J. Goggin and I. Kearney, 2009. Quarterly Economic Commentary, Spring, Dublin: The Economic and Social Research Institute.
- Bergin A., T. Conefrey, J. FitzGerald and I. Kearney, 2009, *Recovery Scenarios for Ireland*, Dublin: The Economic and Social Research Institute, Research Series No. 7.
- Blanchard, O., 2001, “Country adjustments within the euro area: lessons after two years”. In *Defining a Macroeconomic Framework for the Euro Area*, London: CEPR.
- Blanchard, O., 2007, “Current account deficits in rich countries”, NBER Working paper No. 12925.
- Butti, M., 2003, *Monetary and Fiscal Policies in EMU*, Cambridge: Cambridge University Press.
- Calmfors, L. ed., 1997, *EMU: A Swedish Perspective*, Boston: Kluwer Academic Publishers.
- Cameron, G., J. Muellbauer and A. Murphy, 2006, “Was there a British House Price Bubble? Evidence from a Regional Panel”, London CEPR 5619
- Chauvin, V. and S. Le Bayon., 2005, “Logement: Sommets Atteints?”, *Lettre de l’OFCE*, No. 257

- Duffy, 2002, "A Descriptive Analysis of the Irish Housing Market", Dublin: ESRI *Quarterly Economic Commentary*, July.
- Duffy, D., Fitz Gerald, J. and I. Kearney, 2005, "Rising House Prices in an Open Labour Market", *Economic and Social Review*, Vol 36 No 3, Winter
- ECB, 2006, "Assessing house price developments in the Euro area", ECB Monthly Bulletin, February.
- EUROFRAME - European Forecasting Network, 2006, "Economic Forecasts of the Euro Area: Forecasts and Policy Analysis", Dublin: The ESRI, Spring.
- Faust, J., Rogers, J. H., & Wright, J. H. 2001. An Empirical Comparison of Bundesbank and ECB Monetary Policy Rules. *Federal Reserve System, International Finance Discussion Papers*, No 705.
- Fitz Gerald, J., 2001, "Fiscal Policy in a Monetary Union: the Case of Ireland", *Quarterly Economic Commentary*, March.
- Fitz Gerald J., A. Bergin, I. Kearney, A. Barrett, D. Duffy, S. Garrett, and Y. McCarthy, 2005, *Medium-Term Review: 2005-2012*, Dublin: The Economic and Social Research Institute.
- Fitz Gerald J., *et al.*, 2008, *Medium-Term Review: 2008-2015*, Dublin: The Economic and Social Research Institute.
- Garcia, J. A., and J. E Rodriguez Hernandez, 2008, "Housing Demand in Spain according to dwelling type: Microeconomic evidence", *Regional Science and Urban Economics*, vol. 38, pp. 363-377.
- Girouard, N., M. Kennedy, P. van den Noord and C. Andre, 2006, "Recent House Price Developments: The Role of Fundamentals", OECD Economics Department Working Paper No. 475.
- Gonzalez, L. and F Ortega, 2009, "Immigration and Housing booms: Evidence from Spain", IZA Discussion Paper No. 4333.
- Himmelberg, C., C. Mayer and T. Sinai, 2005, "Assessing High House Prices: Bubbles, Fundamentals, and Misperceptions", *Journal of Economic Perspectives*, Vol. 19, No.4.
- Holland D., R. Barrell, T. Fic, I. Hurst, I Liadze., A. Orzagani and V. Pillionca, "The World Economy", *National Institute Economic Review*, No. 208, April.
- Honohan, P. and D. Klingebiel, 2003, "The Fiscal Cost Implications of an Accommodating Approach to Banking Crises" *Journal of Banking and Finance*. 2003.
- Jonung, L., J. Kiander and P. Vartia, 2008. "The great crisis in Finland and Sweden – The macrodynamics of boom, bust and recovery 1985-2000. Report for the study Crises, macroeconomic performance and economic policies in Finland and Sweden in the 1990s: A comparative approach", Working paper, Brussels: DG ECFIN.
- Keeton, W., and K. Hecht, 1987, "Banking Performance in tenth District States", *Federal Reserve Bank of Kansas City Economic Review*, July-August, Volume 72, Number 7
- Kelly, M., 2007, "On the Likely Extent of Falls in Irish House Prices", Dublin: ESRI *Quarterly Economic Commentary*, Summer.
- Kenny, G., 1999. "Modelling the Demand and Supply Sides of the Housing Market: Evidence from Ireland", *Economic Modelling*, 16, pp. 389-409.
- McQuinn, K. 2004. "A Model of the Irish Housing Sector", *Central Bank and Financial Services Authority of Ireland*, Research Paper 1/RT/04.

- Muellbauer, J. and A. Murphy, 2008, "Economic Influences on International Migration for the UK", Oxford University mimeo.
- Murphy, A. 1998. "Econometric Modelling of the Irish Housing Market", in P. Bacon, F. MacCabe, & A. Murphy, eds. (eds.), *An Economic Assessment of Recent House Price Developments*, Dublin: Government of Ireland Publications, Stationery Office.
- Murphy, 2006, "Modelling Irish House Prices: A Review and Some New Results", Nuffield College Oxford mimeo.
- OECD, 2005, *Economic Outlook*, Paris: OECD.
- Pawlowski, 2006, "Financial System Stability in the New EU Member States Ahead of the Euro Adoption", Appendix to Euroframe, *Economic Assessment of the Euro Area*, Spring Report 2006.
- Rae, D. and P. van den NOORD, 2006, "Ireland's Housing Boom: What has driven it and have prices overshot?", Paris: OECD Economics Department Working Paper No. 492.
- Roche, M. 2001. "The Rise in House Prices in Dublin: Fad or Just Fundamentals?", *Economic Modelling*, 18, pp. 281-295.
- Roche, M. 2003. "Will there be a Crash in Irish House Prices?", *Quarterly Economic Commentary*, Winter, pp. 57-72.
- Treasury, HM, 2003, *Fiscal Stabilisation and EMU*, London: HM Treasury.
- van den NOORD, P., 2006 "Are House Prices Nearing a Peak? A Probit Analysis for 17 Countries", Paris: OECD Economics Department Working Paper No. 88.

Appendix 1

(1). Inverted demand equation for new house prices: Ireland

$$\begin{aligned} \text{Log}\left(\frac{PHNEW}{PC}\right)_t &= 8.41 + 0.99 \log\left(\frac{Y}{POP}\right) - 3.79 \log\left(1 + \frac{HSTOCK}{POP}\right) \\ &\quad + 14.12 \left(\frac{POP2534}{POP}\right) - 0.97(rr) + 0.11(D03) \end{aligned}$$

(2). Inverted demand equation for new house prices: Spain

$$\begin{aligned} \text{Log}\left(\frac{PHNEW}{PC}\right)_t &= -6.71 + 1.13 \log\left(\frac{Y}{POP}\right) - 8.22 \log\left(\frac{1 + HSTOCK}{POP}\right) \\ &\quad + 25.61 \left(\frac{POP2534}{POP}\right) - 0.85 \log(rr) + 0.11(D87) + 0.27D(03) \end{aligned}$$

Dependent variable: Log (real new house prices)		Ireland (1974 – 2006)		Spain (1978 - 2005)	
Variables in model:	Description:	Coefficients:	t-statistic	Coefficients:	t-statistic
C	Intercept	8.41	56.78	-6.71	-2.51
LOG(Y)	Log (Income per capita)	0.99	6.56	1.13	2.54
LOG(HSTOCK)	Log (housing stock per capita)	-3.79	-2.67	-8.22	-3.73
POP2534	Household formation ratio	14.12	6.96	25.61	2.93
LOG(rr)	User cost lagged one year	-0.97	-4.33	-0.85	-5.23
D87	Dummy from 1987 onwards			0.11	1.89
D03	Dummy from 2003 onwards	0.11	3.16	0.27	5.08
Number of observations		33		28	
R ²		0.99		0.99	
Adjusted R ²		0.99		0.98	
		Test statistic:		Test statistic:	
S.E. of regression		0.04		0.05	
Sum squared resid		0.05		0.06	
Log likelihood		60.41		47.43	
F-statistic		503.08		239.78	
S.D. dependent var		0.38		0.38	
Akaike info criterion		-3.30		-2.89	
Durbin-Watson stat		1.26		1.53	

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