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A Bird's Eye View of OECD Housing Markets

Christophe André

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ABSTRACT/RÉSUMÉ

A bird's eye view of OECD housing markets

Housing markets have played a prominent role in macroeconomic developments over recent years. For a great part of the 2000s, buoyant housing markets have contributed to sustained economic activity in most OECD countries. But many markets overheated and the collapse of the US subprime mortgage market has been at the epicentre of a deep financial and economic crisis. Against this background, this paper: i) documents housing market developments in 18 OECD countries since the 1970s, putting recent evolutions into historical perspective; ii) examines the drivers of supply and demand for housing; iii) investigates the interactions between housing markets and the wider economy; iv) assesses the responsibilities of housing taxation, monetary policy and financial supervision and regulation in fuelling or amplifying housing booms; v) explores the link between global imbalances and housing booms.

JEL codes: R21; R31; G21; E52; G18; H24; E21; F32; F34
Keywords: Housing markets; house prices; mortgage markets; monetary policy; financial regulation; taxation; saving; wealth; global imbalances.

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Un survol des marchés immobiliers de l'OCDE

Les marchés immobiliers ont joué un rôle important dans les évolutions macroéconomiques de ces dernières années. Durant une grande partie des années 2000, des marchés immobiliers dynamiques ont contribué à une activité économique soutenue dans la plupart des pays de l'OCDE. Mais de nombreux marchés se sont emballés et l'écroulement du marché hypothécaire « subprime » aux États-Unis a été à l'épicentre d'une profonde crise financière et économique. Dans ce contexte, ce document : i) analyse les évolutions des marchés immobiliers dans 18 pays de l'OCDE depuis les années 1970, replaçant les développements récents dans une perspective historique ; ii) examine les déterminants de l'offre et de la demande de logements ; iii) étudie les interactions entre les marchés immobiliers et l'économie dans son ensemble ; iv) évalue les responsabilités de la fiscalité du logement, de la politique monétaire, de la régulation et de la supervision financières dans l'alimentation ou l'amplification des « booms » immobiliers ; v) considère le lien entre déséquilibres mondiaux et envolées immobilières.

Classification JEL: R21; R31; G21; E52; G18; H24; E21; F32; F34
Mots clés: Marchés immobiliers; prix des logements; marchés hypothécaires; politique monétaire; régulation financière; fiscalité; épargne; patrimoine; déséquilibres mondiaux.

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A BIRD'S EYE VIEW OF OECD HOUSING MARKETS

Christophe André[1]

1. Introduction

1. Over the past decade, the world has experienced an unprecedented house price boom in terms of magnitude and duration, but also of synchronisation across countries. During the 2001 recession, house prices disconnected from the business cycle. Low interest rates and mortgage market innovations fuelled housing demand and mortgage equity withdrawal boosted private consumption in a number of economies, in particular in English-speaking countries. Household debt reached record levels in many OECD economies. The global "savings glut" associated with global trade imbalances helped keeping long-term interest rates low, which along with lax lending standards and opaque securitisation in some countries, extended the boom. In some markets, sustained house price increases led to exuberance linked to the belief that the upward trend could go on forever. After prices started to fall in some US States around the end of 2006, the subprime mortgage market collapsed, triggering a deep financial crisis, which plunged the world economy into the worst economic recession since the Great Depression. Outside the United States, housing markets, which had been overheating, have also adjusted dramatically. There is a risk that tighter financing conditions and the recession might put additional pressure on housing markets, even though there are early signs of stabilisation or recovery of housing markets in many countries. Against this backdrop, this paper documents developments in a sample of 18 OECD countries' housing markets since 1970, putting recent evolutions into historical perspective and elaborates on a number of important issues with regard to housing market dynamics and policies. While each of these issues would deserve an in-depth study, the aim of this paper is to give an overview of the most important interactions between housing markets and the macroeconomy.[2]

2. The paper is organised as follows. Section 2 describes the recent evolution of real house prices – house prices adjusted for the change in the consumer price index – and real residential investment, as well as price-to-income and price-to-rent ratios, evaluating them against historical norms. As low borrowing costs have played a major role in boosting housing demand and prices in many countries, a simple asset-

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2. These issues are currently the most widely discussed among macroeconomists. They are arguably the most important from a macroeconomic point of view. Other housing-related issues, which might be more important from another perspective, *e.g.* social or structural housing and economic policies, are not discussed here.

pricing model is used to provide insight into the link between the evolution of house prices and the user cost of housing. Section 3 examines the drivers of supply and demand. Section 4 looks at the interactions between housing markets and the wider economy, highlighting the role of macroeconomic policies, financial regulation and supervision failures, global imbalances and taxation during the latest housing boom.

2. Recent developments in OECD housing markets

2.1. Real house prices and residential investment

3. Between 1995 and their latest cyclical peak, which was reached between the third quarter of 2006 and the first quarter of 2008 depending on the country, real house prices had nearly tripled in Ireland, had been multiplied by about two and a half in the United Kingdom and had approximately doubled in nine other countries in the sample, including many European countries, as well as Australia and New Zealand (Figure 1). [3] Price increases had been smaller, but still considerable – at over 50% – in Canada, Italy and the United States. Finally, four countries did not experience a housing boom: prices remained broadly stable in Korea, after recovering from the 1997 Asian crisis, rose at a moderate pace in Switzerland and continued a decline initiated in the early-nineties in Germany and Japan.

4. Compared with previous house price cycles going back to the seventies, the latest expansion has been truly exceptional in three respects:

- *Real house price have soared*. During the recent boom, house prices rose by 120% on average.[4] The average real price increase during earlier expansions had been around 45% (Girouard *et al.*, 2006a). In only two previous expansions did real prices more than double: in Finland in the eighties, with an acceleration of the rate of price increase towards the end of the decade, when the economy was undergoing sweeping transformations; and in Spain immediately after it joined the European Community in 1986. In three other episodes, prices came close to doubling: in Italy and the Netherlands in the seventies and in the United Kingdom in the eighties (Table 1).[5]
- *The expansion has been exceptionally long*. Historically, the duration of the house price cycle has been around 10 years, roughly similar to that of the business cycle, with which it used to be synchronised. The average expansion phase has lasted around six years. In contrast, the latest upturn went on for about twelve years on average across countries. The exceptional length of the latest expansion means that the house price cycle has become disconnected from the business cycle. In previous cycles, peaks in house prices approximately coincided with peaks in the business cycle, as measured by the output gap (Figure 2). Remarkably, the turnaround in the business cycle at the beginning of the current decade was not matched by a slowdown of house prices.

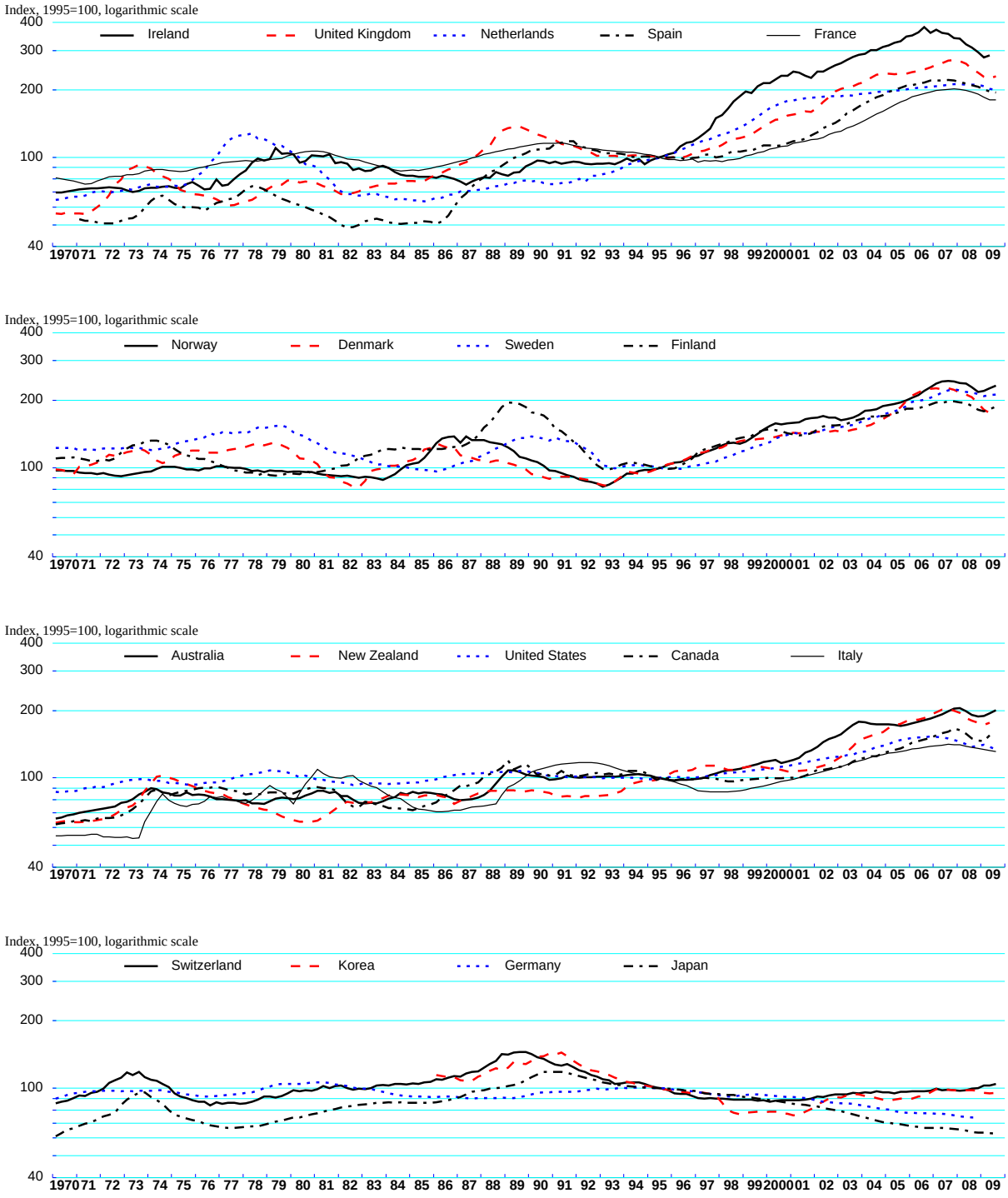
3. The sources of the house price indices used in this paper are indicated in the Annex (Table A.1).

4. Unweighted average of price increases in countries which experienced an upturn.

5. The price of a house reflects the price of the building and the price of the land on which it is built. Statistics on constructible land prices are scarce. The cost of construction can be measured by the deflator of residential investment. Real construction costs have been increasing rapidly from 2000 to the peak of the cycle in many countries – *e.g.* Ireland, United Kingdom and Spain – which could reflect higher prices of construction material, rising marginal costs due to tensions on production capacity and higher profit margins of developers in a buoyant market. On average, construction costs between 1995 and 2007 increased at a pace of about a fourth of that of house prices, but with significant differences across countries (Table A.2).

Figure 1. Real house prices

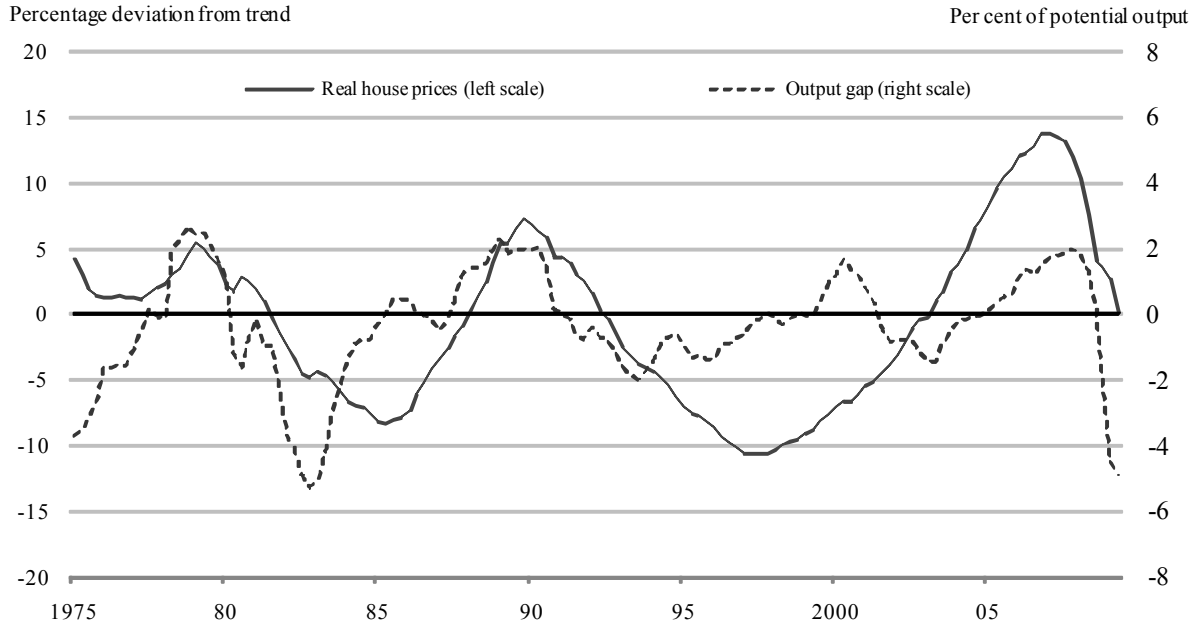
Nominal prices deflated by the consumer price index



Source: National sources, BIS and OECD calculations.

- *Most countries in the sample experienced a house price boom simultaneously*. If one defines a boom as an increase in real house prices of 25% or more over five years,[6] more than three-fourths of the countries in the sample (thirteen out of seventeen) experienced a boom in recent years.[7] This proportion significantly exceeds that of roughly half of the sample (nine countries out of seventeen) observed during the previous upswing which reached its peak around 1989-90. Synchronised booms were even more uncommon in the seventies when the proportion of countries in a boom never reached a third of the sample.

Figure 2. OECD Real house prices and the business cycle



Note: Real house prices have been detrended using a linear trend. The OECD real house price index is an aggregate of the 17 countries for which time series start in the early 1970s, computed using purchasing power parity-adjusted GDP weights.

Source: OECD calculations.

5. Residential investment has responded to higher house prices to a various degree across countries (Figure 3). In Ireland, real residential investment has been multiplied by three between 1995 and 2006. In Spain, it has been multiplied by nearly 2½ between 1995 and 2007. In the United Kingdom, the Netherlands and France, increases in residential investment have been more modest, despite large house price increases, suggesting that supply is fairly inelastic in these countries. From 1995 to its peak, real residential investment has approximately doubled in the Nordic countries and Canada and has risen by about 70% in the United States. Increases were more modest in Australia, New Zealand and Italy. In the four countries where prices have been rising modestly or declining – Switzerland, Korea, Germany and Japan – residential investment has also been stagnating or falling.

6. About twice the mean annual change in real house prices (unweighted across countries), sustained over five years.

7. Korea is not included in this comparison because the data only start in 1986.

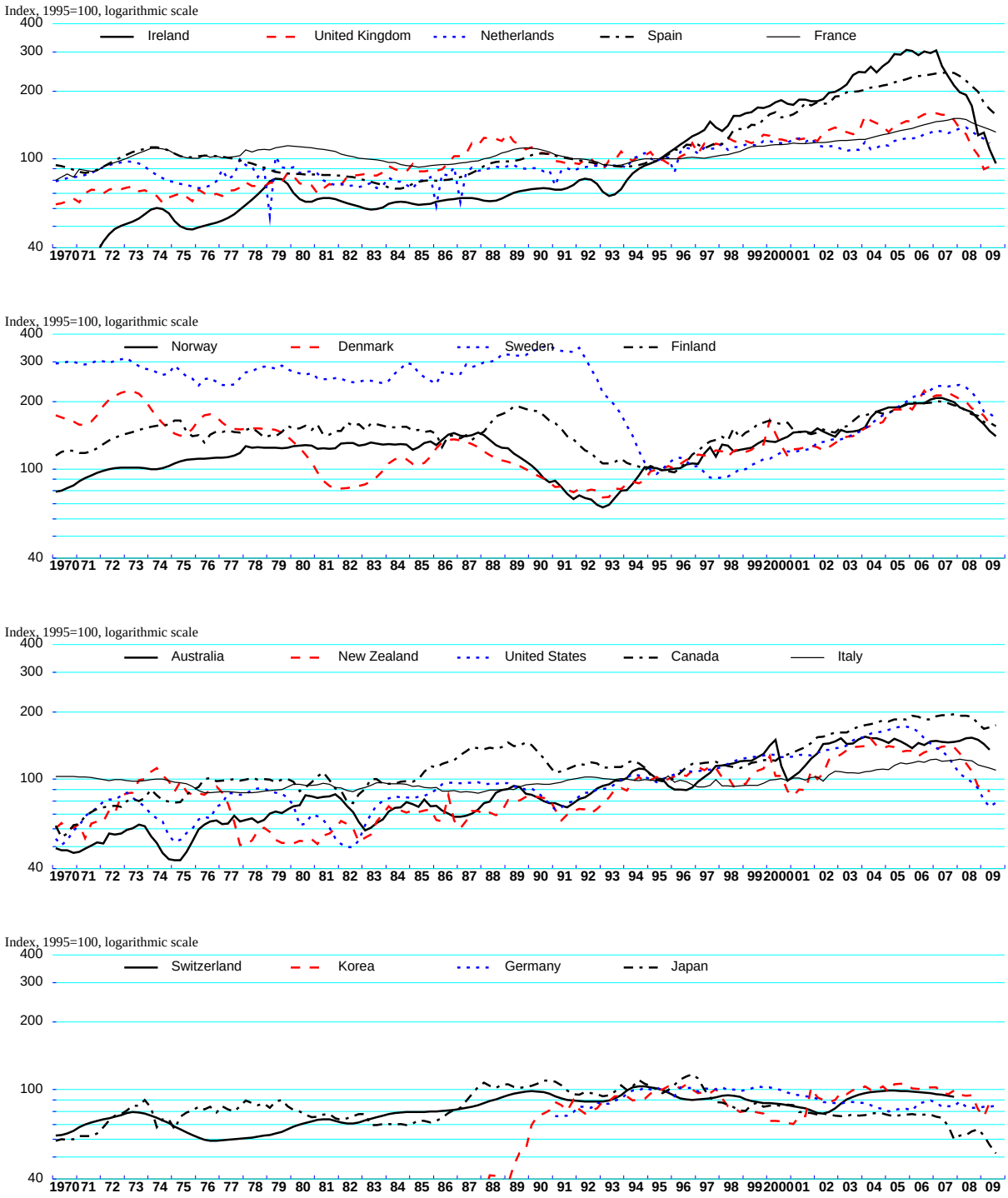
Table 1. Major real house price cycles by country[1]

Country	Upturns	Duration (quarters)	Downturns	Duration (quarters)
United States	1982Q3-1989Q4: +17.0%	23		
	1995Q1-2006Q4: +56.1%	47		
Japan	1970Q1-1973Q4: +56.5%	15	1973Q4-1977Q3: -30.5%	15
	1977Q3-1991Q1: +77.6%	54	*1991Q1-2009Q3: -47.2%*	*74*
Germany	1976Q2-1981Q2: +15.7%	20	1981Q2-1987Q3: -15.3%	25
			1994Q4-2008Q4: -26.5%	*56*
France	1970Q1-1981Q1: +31.2%	44	1981Q1-1984Q3: -18.1%	14
	1984Q3- 1991Q2: +33.0%	27	1991Q2-1997Q1: -18.0%	23
	1997Q1-2007Q4: +112.6%	43		
Italy	1970Q1-1981Q1: +98.0%	44	1981Q1-1986Q2: -35.3%	21
	1986Q2-1992Q3: +65.8%	25	1992Q3-1998Q2: -26.0%	23
	1998Q2-2007Q3: +62.9%	37		
United Kingdom	1970Q1-1973Q3: +64.9%	14	1973Q3-1977Q3: -33.7%	16
	1977Q3-1980Q1: +28.0%	11		
	1982Q1-1989Q3: +99.6%	30	1989Q3-1995Q4: -27.8%	25
	1995Q4-2007Q4: +173.3%	48	2007Q4-2009Q2: -17.2%	6
Canada	1970Q1-1976Q4: +46.4%	27		
			1981Q1-1985Q1: -20.9%	16
	1985Q1-1989Q1: +66.5%	16		
	1998Q3-2007Q4: +72.0%	37		
Australia	1970Q1-1974Q1: +36.3%	16		
	1987:1-1989Q1: +35.9%	8		
	1996Q1-2008Q1: +108.9%	48		
Denmark	1970Q1-1979Q2: +32.1%	37	1979Q2-1982Q4: -36.8%	14
	1982Q4-1986Q1: +56.5%	13	1986Q1-1993Q2: -35.6%	29
	1993Q2-2007Q1: +174.3%	55	*2007Q1-2009Q2: -22.7%*	*9*
Finland	1970Q1-1974Q2: +23.6%	10	1974Q2-1979Q1: -30.3%	19
	1979Q1-1989Q1: +111.8%	40	1989Q1-1993Q2: -49.7%	17
	1993Q2-2007Q4: +109.1%	58		
Ireland	1970Q1-1981Q3: +53.9%	46	1981Q3-1987Q2: -27.1%	23
	1987Q2-1990Q2: +27.7%	12		
	1992Q3-2006Q3: +310.2%	56	2006Q3-2009Q1: -26.6%	9
Korea[2]	1987Q3-1991Q2: +33.5%	15	1991Q2-2001Q1: -47.5%	39
	2001Q1-2003Q3: +24.5%	10		
Netherlands	1970Q1-1978Q2: +98.4%	33	1978Q2-1985Q3: -50.4%	29
	1985Q3-2008Q1: +233.9%	90		
New Zealand	1970Q1-1974Q3: +62.7%	18	1974Q3-1980Q4: -37.8	25
	1980Q4-1984Q2: +32.5%	14		
	1986Q4-1989Q1: +15.1%	9		
	1992Q1-1997Q3: +38.9%	22		
	2000Q4-2007Q3: +89.7%	27		
Norway	1983Q4-1986Q4: +56.3%	12	1986Q4-1993Q1: -40.6%	25
	1993Q1-2007Q3: +198.5%	58		
Spain	1971Q1-1974Q3: +27.5%	14		
	1976Q2-1978Q2: +28.6%	8	1978Q2-1986Q1: -32.2%	31
	1986Q1-1991Q4: +135.1%	23	1991Q4-1996Q3: -17.6%	19
	1996Q3-2007Q3: +127.1%	44		
Sweden	1974Q1-1979Q3: +29.2%	22	1979Q3-1986Q1: -37.9%	26
	1986Q1-1990Q1: +42.5%	16	1990Q1-1996Q2: -28.2%	25
	1996Q2-2007Q4: +126.4%	46		
Switzerland	1970Q1-1973Q3: +37.7%	14	1973Q3-1976Q3: -29.0%	12
	1976Q3-1989Q4: +73.5%	53	1989Q4-2000Q1: -40.7%	41
	2000Q1-2009Q3: +20.0%	*38*		

Note: Italics highlight upturns or downturns which are continuing.
1. Major upturns and downturns are charactrised by real house price changes of at least 15%.
2. The period covered for Korea starts in 1986 Q1.
Source: OECD calculations.

Figure 3. Residential investment

Volume indices



Source: OECD Economic Outlook 86 database.

2.2. Affordability ratio (price-to-income) and price-to-rent ratio

6. The price-to-income and the price-to-rent ratios are two widely used indicators of housing market conditions. Historically, these ratios have generally tended to revert to their long-term average, even though they often deviated from it for protracted periods.[8] Hence, large deviations of the price-to-income and price-to-rent ratios from their historical level could indicate over- or under-valuation of houses. The price-to-income ratio can be interpreted as a measure of the affordability of housing. When house prices rise relative to *per capita* disposable income, it becomes increasingly difficult for households to buy dwellings. They will normally reduce their demand, driving prices down. The price-to-rent ratio – measured here as the ratio of nominal house prices to the rent component of the consumer price index – reflects the cost of owning a house relative to that of renting it. If prices increase relative to rents, more households should choose to rent rather than to buy, driving rents up and prices down.

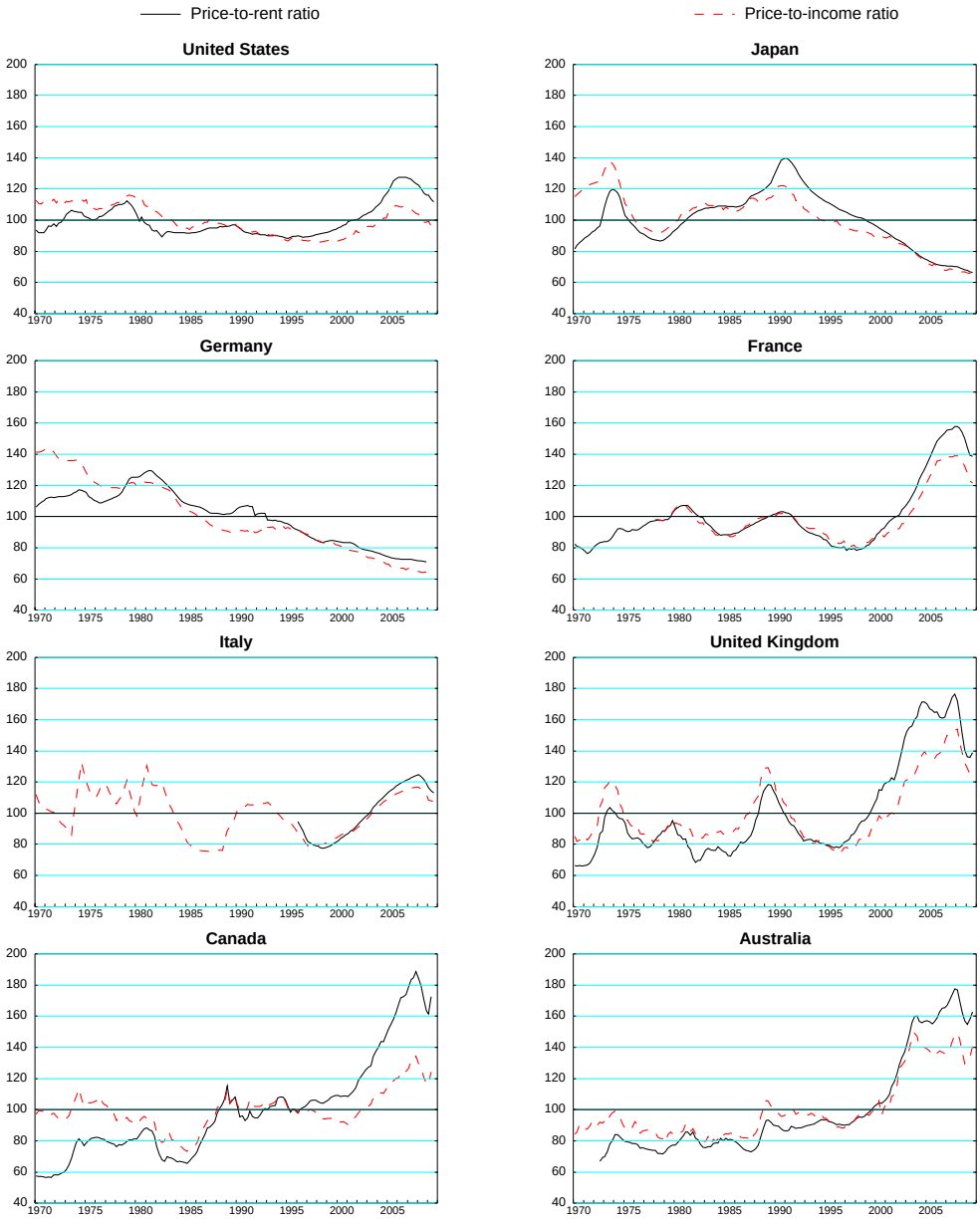
7. During the latest cyclical upswing, both price-to-income and price-to-rent ratios reached historical highs – at least since 1970 – in most countries in the sample (Figure 4). At the peak of the cycle, price-to-income ratios exceeded 150 in seven countries (a value of 100 corresponding to the long-term average of the ratio). Price-to-rent ratios had risen to above 150 in twelve countries. To put these numbers into perspective, price-to-income ratios had never reached 150 in any country in the past. Apart from a few episodes in the 1970s, values only came close to this level in the Finnish boom in the late 1980s, which ended with a dramatic adjustment. Similarly, price-to-rent ratios had never touched the 150 mark before the latest boom. They approached this level in a few cases: again, in Finland in the late 1980s, in Japan and Switzerland around 1990 and in the Netherlands in late 1970s. In all instances, an abrupt adjustment followed.

8. Despite recent falls, price-to-income and price-to-rent ratios remain well above their long-term averages in many countries, suggesting that further adjustments might need to take place. However, one cannot exclude an upward shift in the equilibrium level in some countries. Furthermore, adjustments in the price-to-income and price-to-rent ratios do not necessarily imply sharp drops in nominal house prices. As nominal house prices usually exhibit some rigidity on the downside, a large share of the adjustments in price-to-income and price-to-rent ratios often comes through increases in the denominator. But it should be noted that such corrections tend to be more protracted in a low-inflation environment (Girouard *et al.*, 2006a).

9. Price-to-income and price-to-rent ratios provide valuable information on the evolution of housing markets. However, they also suffer from a number of limitations. Disposable *per capita* income, the denominator of the price-to-income ratio, reflects the average evolution of income for the whole population of a country. The average income might not be representative of the revenue of buyers and sellers of houses, which are likely to be concentrated in some specific age groups. Affordability is also affected by changes in the size of households. More importantly, as most households are borrowing to finance their acquisition of homes, financing costs should be taken into account. Price-to-rent ratios suffer from similar shortcomings. Characteristics and locations of dwellings might vary between the owner and the rental markets. Furthermore, in many countries rents are tightly regulated. These factors could justify diverging rent and house price developments. Finally, as for the price-to-income ratio, financing costs have an important impact on the price-to-rent ratio. This can be illustrated using a simple asset-pricing model.

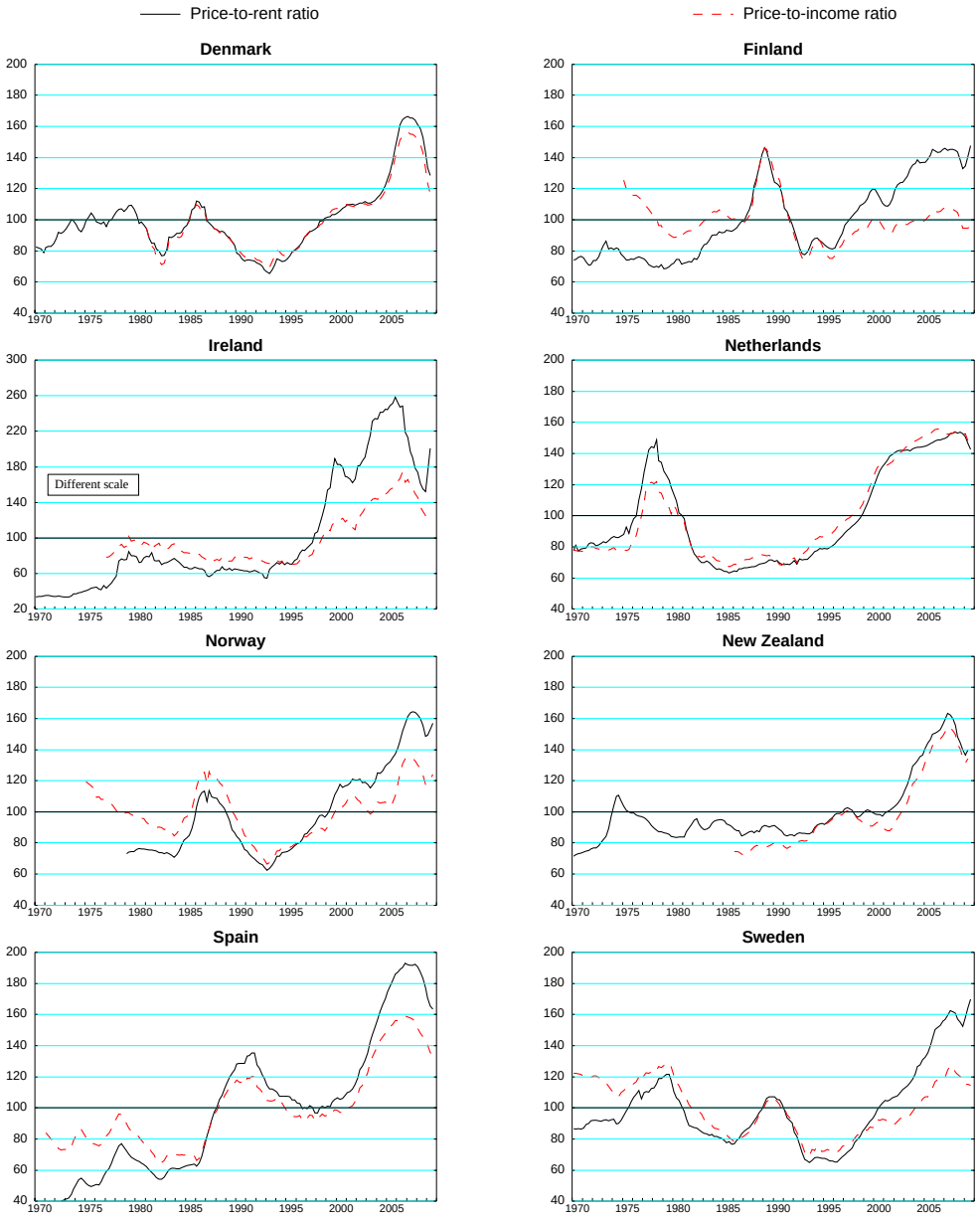
8. In some countries, trends or shifts in levels have been observed. More generally, the sluggishness of the mean-reversion process results in usual unit root tests, such as the Augmented Dickey-Fuller test, rejecting in most cases the hypothesis of stationarity (Girouard *et al.*, 2006a).

Figure 4. Price-to-income and price-to-rent ratios
Sample average = 100



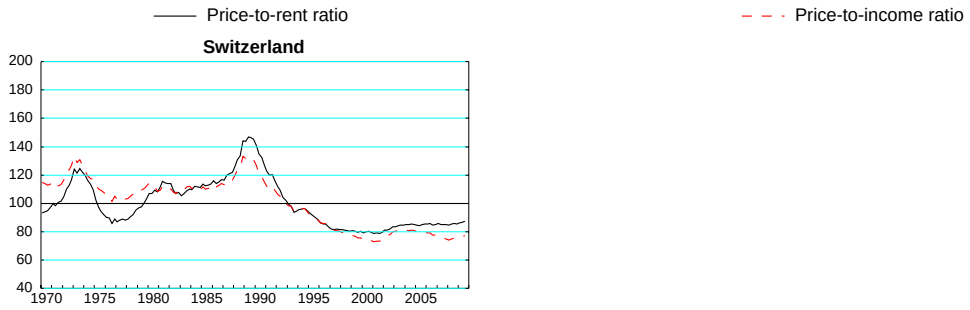
Source: OECD calculations.

Figure 4. Price-to-income and price-to-rent ratios (cont.)
Sample average = 100



Source: OECD calculations.

Figure 4. Price-to-income and price-to-rent ratios (cont.)
Sample average = 100



Source: OECD calculations.

2.3. Asset-pricing model

10. The housing valuation model proposed by Poterba (1984) can be used to assess the influence of the user cost of housing on the price-to-rent ratio. According to the model, in equilibrium, rents should equal the user cost of housing:

$$R = P(i^a + \tau + f - \pi) \tag{1}$$

where R represents rents, P nominal house prices, i^a the after-tax nominal mortgage interest rate, τ the property tax rate on owner-occupied houses, f the recurring holding costs consisting of depreciation, maintenance and the risk premium on residential property and π, the expected capital gains on houses.

11. Using equation (1), it is possible to compute a "fundamental" value of the price-to-rent ratio. As τ and f usually display a lot of inertia, the parameters which shape the evolution of the user cost of housing are primarily the after-tax mortgage rate and the expected capital gains on houses.[9] A difficulty is to choose a representative mortgage rate. Since the mortgage rate in equation (1) is used to discount future rents over an infinite horizon, it should be a long-term rate. While finding a representative long-term mortgage rate is reasonably straightforward in countries were fixed-rate mortgages are predominant, it is more difficult in countries where adjustable-rates are prevalent. An alternative to using representative mortgage rates is to use 10-year government bond yields. These are usually moving in line with fixed mortgage rates, refer to clear maturities and are much more comparable across countries. However, they fail to account for specific mortgage market developments, reflected in spreads between mortgage rates and government bond yields. During the latest housing booms, these spreads have declined in many countries, but the financial crisis has caused them to widen again. Given that using either type of interest rates has pros and cons, alternative "fundamental" price-to-rent ratios have been constructed.[10] For most countries, results are qualitatively similar. However, differences are quite large for some countries, reflecting differing evolutions in short and long term interest rates in countries where variable rate

9. In our calculations, the recurring holding costs (f) were set at 4% for all countries over the whole period. For most countries, property taxes (τ) were also held constant (Denmark is an exception).

10. The calculation using the representative mortgage rate was the one adopted in Girouard *et al.* (2006), which provides more details on the sources of the variables used in the model.

mortgages are predominant – *e.g.* Finland and Norway – or changes in mortgage risk premiums relative to government bonds – *e.g.* Canada and New Zealand (Figure 5).[11]

12. The assumption regarding expected capital gains on houses is also crucial for the evolution of "fundamental" price-to-rent ratios. It is assumed that households expect real house prices to remain constant in real terms – *i.e.* they expect no real capital gains.[12] Inflation expectations are supposed to be backward-looking. Hence, expected capital gains are computed as a five-year moving-average of the consumer price inflation rate.

13. When comparing "fundamental" to actual price-to-rent ratios, two caveats should be kept in mind. First, the model assumes perfect arbitrage between renting and owning. In practice, arbitrage is imperfect (Glaeser and Gyourko, 2007). A number of reasons can explain that households do not switch between renting and owning easily: transaction costs for houses are often high; a dwelling is an investment good, but also a consumption good, from which households derive financial value – equivalent to the imputed rent – but also non-financial utility; home-ownership provides a hedge against future rent increases. Second, housing market adjustments take considerable time. While equities can generally be sold instantly when their market value is perceived to exceed the future flow of dividends they are likely to generate, houses need more time to be traded. Furthermore, nominal house prices tend to be sticky on the downside and regulations usually prevent rents to adjust instantly. Therefore, actual price-to-rent ratios cannot be expected to track closely short-term movements in "fundamental" ratios. The latter should be seen as providing an approximate benchmark for valuations rather than a precise measurement.

14. Nevertheless, comparing the evolution of "fundamental" and actual price-to-rent ratios indicates the important role of interest rates in explaining price-to-rent ratios and provides a rough assessment of the over- or under-valuation of housing markets. The picture which emerges from figure 5 is that, in most countries, declines in interest rates reflected in the "fundamental" ratios are able to explain a great part of house price increases between 2000 and 2004. But after 2004, sustained house price appreciations were no longer supported by the evolution of the user cost of housing. Around 2007, actual price-to-rent ratios started to move back towards their "fundamental" value. Recently, as a result of policy actions to fight the recessions, mortgage rates have moved down significantly in many countries. As a result, "fundamental" price-to-rent ratios have often gone up. However, this result should be taken with caution, because lower interest rates have been accompanied by tighter lending conditions during the recent financial turmoil.[13] A number of potential buyers have been denied access to credit, and demand has therefore been weaker, all other things equal, than the level of interest rates would have implied.[14]

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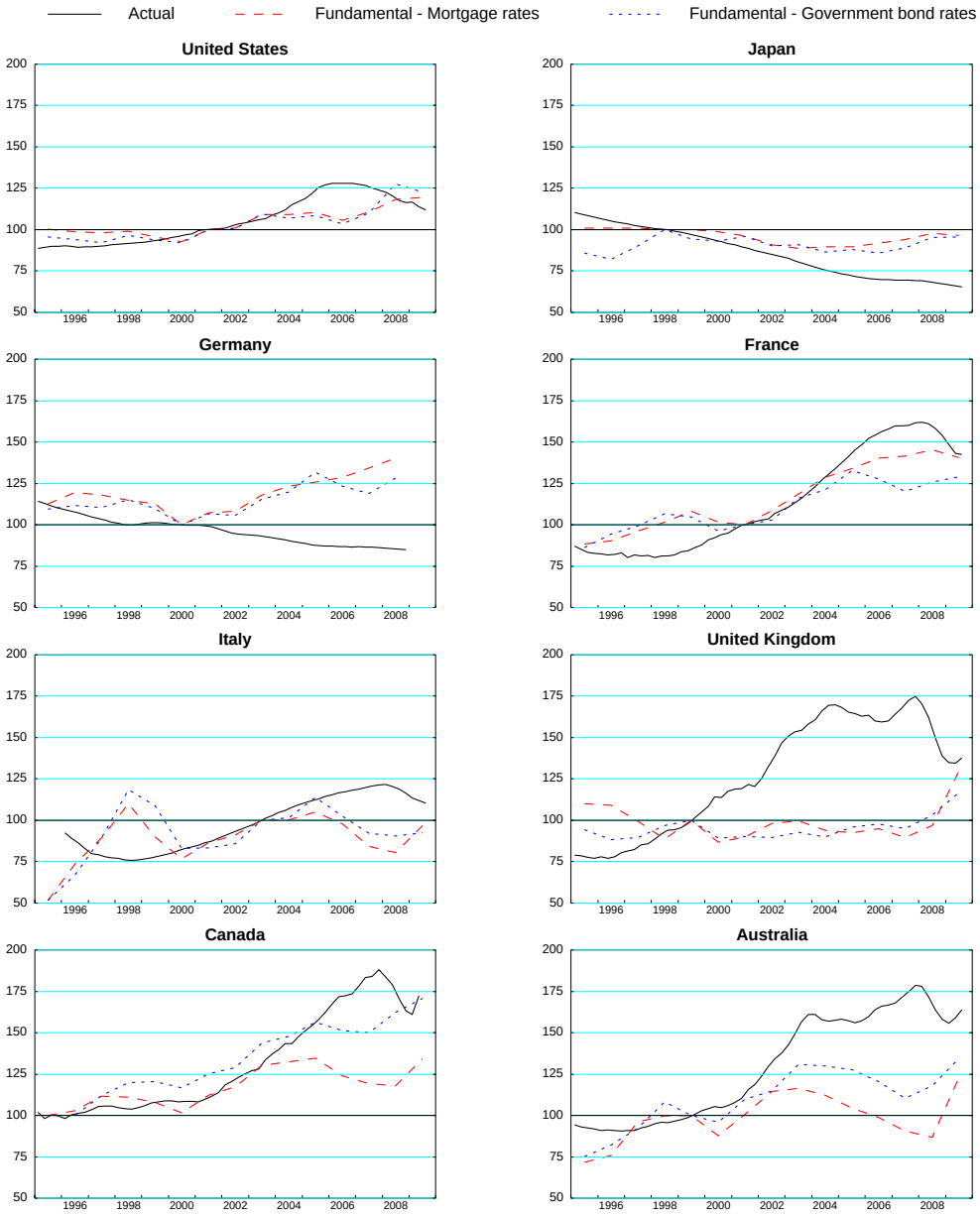
11. For Ireland, the divergence between the two "fundamental" price-to-rent ratios in late 2008 and early 2009 reflects a substantial increase in sovereign bond spreads. It is also worth noting that the recent rebound in the actual price-to-rent ratio mainly reflects a fall in the rent component of the CPI. This result should be interpreted with caution as the rent component of the CPI is an imperfect proxy for rents in Ireland, as it includes mortgage interest costs.

12. The objective is to compute a conservative "fundamental" benchmark that does not incorporate real capital gains expectations, which in most cases tend to be over-optimistic.

13. According to bank lending surveys, the net percentage of banks reporting tightening mortgage lending standards over the previous three months reached more than 70% in the United States – 100% for subprime loans – and over 40% in the euro area and the United Kingdom at some point in 2008. However, in recent months, mortgage financing conditions have generally been improving.

14. This could be accounted for by introducing the shadow price of the rationing constraint into the calculation of the user cost of housing (Meen, 2008). But since shadow prices are not observable, they have to be estimated. This is beyond the scope of this paper.

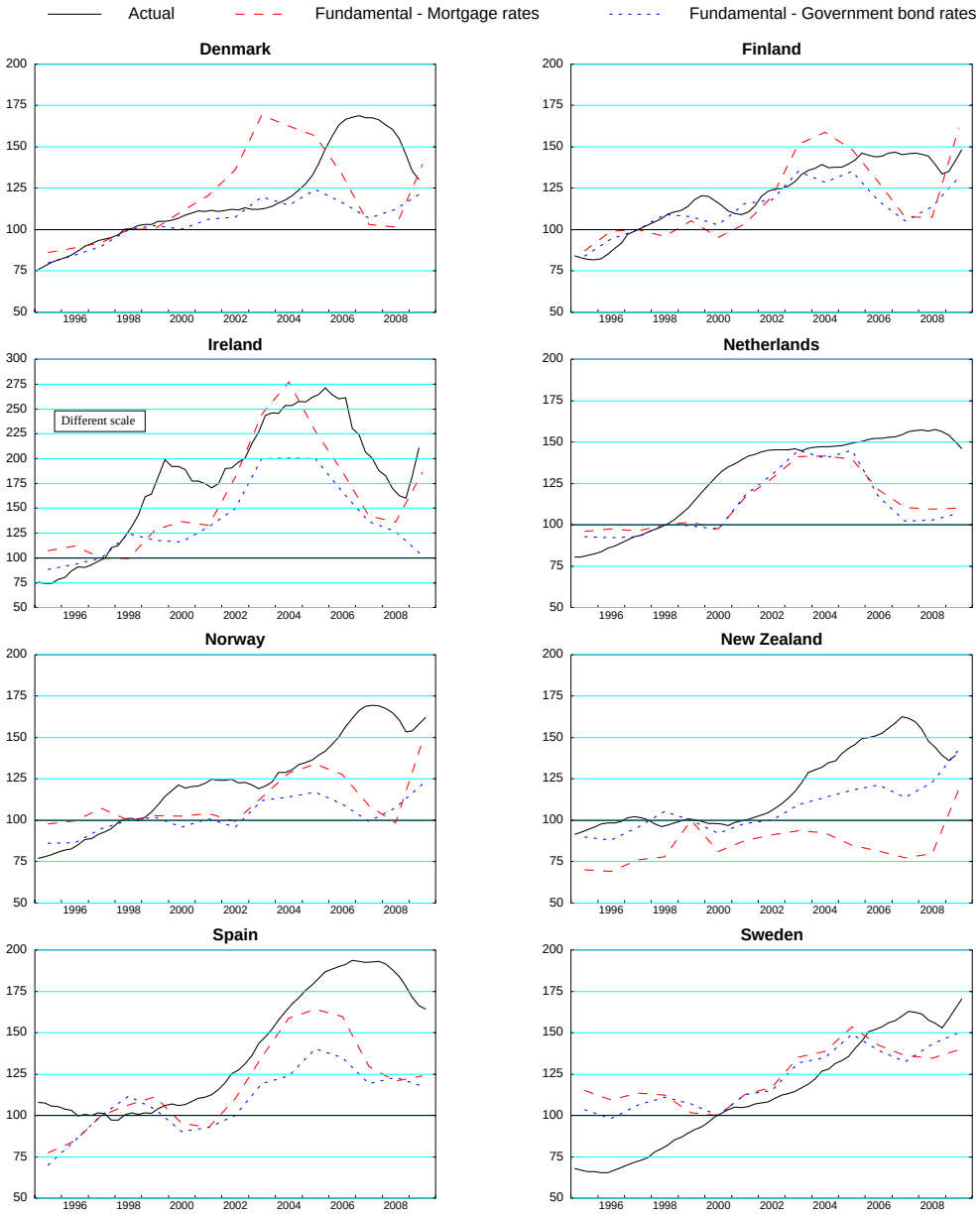
Figure 5. Price-to-rent ratios: actual and fundamental
Long-term average = 100



1. For each country, actual and fundamental price-to-rent ratios have been set equal to 100 in the most recent year in which the actual price-to-rent ratio was close to its long-term average (since 1970). This procedure does not work well for Germany because of the significant trend decline in the price-to-rent ratio starting in the early 1980s. Consequently, the two series have been arbitrarily set equal to each other in 2000. Choosing an earlier date does not change the results, qualitatively, although the implied degree of undervaluation would be larger.

Source: Author's calculations.

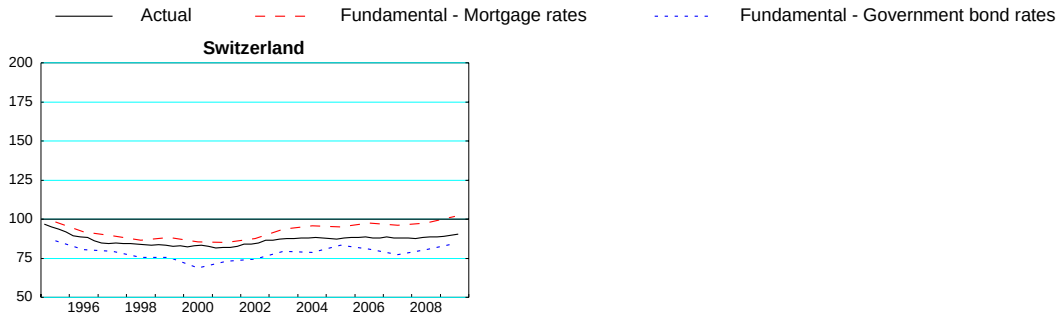
Figure 5. Price-to-rent ratios: actual and fundamental (cont.)
Long-term average = 100



1. For each country, actual and fundamental price-to-rent ratios have been set equal to 100 in the most recent year in which the actual price-to-rent ratio was close to its long-term average (since 1970).

Source: Author's calculations.

Figure 5. Price-to-rent ratios: actual and fundamental (cont.)
Long-term average = 100



1. For each country, actual and fundamental price-to-rent ratios have been set equal to 100 in the most recent year in which the actual price-to-rent ratio was close to its long-term average (since 1970).
Source: Author's calculations.

15. Recently, as a result of declining house prices and lower mortgage rates, the gap between actual and "fundamental" price-to-rent ratios has narrowed significantly in many countries. In particular, price-to-rent ratios now seem in line with fundamentals in the United States and the United Kingdom. This is consistent with the early signs of stabilisation observed in these economies. Price-to-rent ratios also seem to be converging to sustainable levels in France, New Zealand, Ireland, Italy and the Nordic countries. The calculations with mortgage rates and government bond rates give conflicting results for Canada. A certain degree of over-valuation could be present in Australia. Finally there are two countries where the model points to large over-valuation: Spain and the Netherlands. Nominal house prices have been falling in Spain since the beginning of 2008 and this trend could continue for some time. In the Netherlands, after registering double-digit increases around the turn of the century, house prices have advanced at a more moderate pace after 2001. This stabilisation at high levels seems to have been supported by very low interest rates from 2003 to 2005. Subsequently, as interest rates rose, lowering the "fundamental" price-to-rent ratios, the market looked increasingly expensive. Prices actually started declining in 2008. Whether this is a temporary consequence of the financial crisis or the start of a protracted decline is difficult to know. One factor which might limit the decline of house prices in the Netherlands is the scarcity of housing supply, as suggested by econometric investigations (Kranendonk and Verbruggen, 2008).

16. To summarise, the asset-pricing model suggests that in many OECD countries, increases in house prices can be fairly well explained by favourable financing conditions in the early stages of the latest expansion. However, the continuation of the boom after 2004 seems to have brought prices out of line with fundamentals. The model also hints that in most OECD countries, current price-to-rent ratios do not deviate markedly from their "fundamental" values. However, it should be noted that this conclusion is the result not only of price falls, but also of significant reductions in mortgage rates. As signalled earlier these declines in mortgage rates might not reflect effective financing conditions as many households are likely to be facing restricted access to loans as a result of the general tightening of credit conditions. According to the asset-pricing model, current price levels in many countries would be sustainable only with persistently low mortgage rates. A rise in mortgage rates, for example as a result of higher inflation expectations or a higher risk premium would likely put renewed downward pressure on prices. But general economic conditions – *e.g.* income growth, employment – are also likely to shape the future path of house prices.

3. Drivers of supply and demand

17. Sharp increases in house prices are not necessarily indicative of a bubble. Girouard *et al.* (2006a) have identified thirty seven major real house price expansions in OECD countries between 1970 and the

mid-1990s.[15] Of these booms, only twenty four, *i.e.* about two-thirds, ended in downturns in which anywhere from one third to well over 100% of the previous real-term gains were wiped out. Rises in house prices could be justified on the basis of improvements in their fundamental determinants, for example by increases in household real income, favourable demographic trends or reduced user cost of housing. Therefore, a closer look at the determinants of supply and demand is warranted.

3.1. Demand

Household real disposable income

18. Household income determines the affordability of housing. Aggregate income is the product of the average income of workers and the level of employment. During the latest expansion, steady income growth and declining unemployment have provided support to housing demand in many countries, though they were generally insufficient to justify the increases in house prices that were recorded recently. Nevertheless, their contribution has been substantial in many countries. Miles and Pillonca (2008) provide a decomposition of house price changes over the period 1996-2006 for 14 OECD countries, based on a simple calibrated model. The results suggest that real income growth contributed about thirty five to forty five percentage points (pp) to real house price increases in most of the countries surveyed. The real income contribution was very high in Norway (57 pp) and especially Ireland, where real income gains alone would have justified more than a doubling of prices (108 pp). At the opposite, the real income contribution was modest in the Netherlands (22 pp) and Italy (9 pp).

Interest rates

19. Mortgage interest rates have come down considerably between 1990 and 2007, both in real and nominal terms. In the country sample, the average nominal mortgage rate went down from about 12 to around 5½ per cent. Real rates declined from above 7 to close to 3½ per cent. Mortgage rates followed the decline in yields on government securities but, in many countries, spreads between mortgage rates and benchmark government bond rates have also narrowed significantly, as a result of increased competition, changes in risk assessment and sometimes cross-subsidisation of products by banks – *e.g.* in France (ECB, 2009). The asset-pricing model described in section 2.3 points to a major influence of lower real interest rates on house prices. Miles and Pillonca (2008) also attribute a large part of real house-price increases to lower real interest rates, which, other things equal, would have generally justified price increase ranging from 30 to 70%.

20. In parallel to the general decrease in interest rates, cross-country differences in interest rates have been reduced. In particular, the creation of the euro has led to a strong convergence of long-term rates in the countries of the area. The convergence has benefited in particular the southern European countries where interest rates have come down considerably and has surely contributed to the convergence of house price levels. According to a study by the Bank of America (Moëc, 2007), the difference between the maximum and minimum price levels among the five largest countries of the euro area has shrunk from 120% of the average in 1996 to less than 30% in 2006. Though part of this reduction can be attributed to convergence in real income levels and other factors – *e.g.* demographics, investment by non-residents – the convergence of interest rates has no doubt been essential.

21. Beyond the effect of real interest rates, a decrease in nominal rates also has a positive effect on housing demand because it alleviates the borrowing constraint of households. This results from the fact that when nominal rates are high, repayments are front-loaded and reduce the amount households can

15. To qualify as a major expansion, the cumulative appreciation in real house prices had to equal or exceed 15%.

borrow, as banks usually limit borrowing to a level corresponding to an initial annuity of a specified fraction of income – generally around one third (Engelhardt, 1996).

Mortgage market sophistication and innovations

22. The process of deregulation of mortgage markets, which allowed increasingly diverse financial institutions to offer mortgages and new categories of products to emerge, started in the 1980s in some parts of the OECD area – especially the English-speaking and Nordic countries. Other countries followed more recently. Recent product innovations, essentially aimed at restoring housing affordability in the face of rising prices, are well documented (*e.g.* Scanlon and Whitehead, 2004; BIS, 2006; ECB, 2009) and only a brief overview will be given here.

23. The main mortgage market developments over the last decade have been as follows:

- *Extension of loan terms:* as price increases made housing less affordable, lenders have tended to lengthen the repayment period of mortgages. Mortgages with terms of up to 50 years are now available in countries such as France, Spain and the United Kingdom (Lunde *et al.*, 2008).
- *Development of interest-only loans:* only interests are paid on a monthly basis, the capital being repaid at the term of the contract. Historically, such contracts were popular in countries like the United Kingdom and the Netherlands where they allowed households to derive the greatest benefit from the tax relief on mortgage interest payments. These mortgages were generally associated with investment products which secured the repayment of the capital at the term of the mortgage.[16] In recent years, interest-only loans, usually not coupled with investment vehicles, developed rapidly in a number of countries, in particular Denmark, Ireland and the United States.[17]
- *Development of loans with flexible repayment schedules:* between the traditional amortisation loan and interest-only loans, a wide range of products allowing flexible reimbursement has appeared. Negative amortisation loans allow repayments that are less than the amount of interest and hence lead to an increase of the debt during the life of the loan. Accordion adjustable-rate mortgages have fixed repayments, but the term of the loan varies with the evolution of interest rates.
- *Increased reliance on adjustable-rate loans:* in some countries where fixed-rate mortgages have traditionally been predominant – *e.g.* France, Netherlands – the share of adjustable-rate loans has increased somewhat during the boom (ECB, 2009). In the United States, the expansion of the subprime mortgage market has pushed the share of adjustable-rate mortgages (ARM) up from 10% of originations in 2001 to 35% in 2004. The share of ARMs has remained close to this level in following years (De Michelis, 2009).

16. In 1995, more than 60% of the new residential loans in the United Kingdom and the Netherlands were interest-only loans. Only a small fraction of these loans were not associated with a repayment vehicle. The mortgage interest tax relief in the United Kingdom was abolished in 2000. In 2005, the share of interest-only loans had fallen to 24%, but most of these were not associated with investment vehicles. In the Netherlands, interest-only loans represented more than 80% of new loans in 2006, but about half of them were not combined with an investment product.

17. Interest-only loans accounted for more than 30% of new loans in Denmark in 2005 and around 13% in Ireland in 2006 (Lunde *et al.*, 2007). In the United States, "according to Loan Performance data, 33.7% of securitised purchase loans originated in the first quarter of 2007 were interest-only and a further 7.3% were negative amortisation" (Ellis, 2008).

- *Increased loan-to-value ratios:* during the latest housing upturn, limits on the amount of mortgages have become less stringent than in the past in many markets. Maximum loan-to-value ratios have generally exceeded 80% in OECD countries and even 100% in the Netherlands and the United Kingdom. In some countries, in particular in the United States, second mortgages – often not disclosed to the originator of the first mortgage – pushed up loan-to-value ratios.
- *Development of housing equity withdrawal:* in a number of countries, especially English-speaking ones, households have increasingly been extracting equity from their homes through cash-out refinancing – *i.e.* negotiating a less costly loan and taking out the difference with the initial loan in cash – or home equity loans – *i.e.* loans using home equity as collateral.
- *Subprime loans:* a market catering to borrowers that do not qualify for conventional loans, because of poor credit history and/or insufficient guarantees to qualify for prime loans has expanded considerably around the mid-2000s in the United States. At its peak, between 2004 and 2006, the subprime market represented around 20% of mortgage originations. The market collapsed in 2007. Subprime loans also existed in the United Kingdom, Australia and Canada. But in these countries, they represented a more limited share of mortgages and underwriting standards seem to have remained much higher than in the United States.
- *Development of securitisation:* increased reliance on securitisation has allowed an expansion in mortgage originations in some countries. In the United States, the emergence of private-label mortgage backed securities has allowed the securitisation of non-conforming loans – *i.e.* mortgages that would not qualify for securitisation by the Government Sponsored Enterprises. Underwriting standards on these non-conforming loans – subprime and Alt-A[18] – proved very lax.[19] Furthermore, the risks associated with structured securities[20] based on mortgages have been very difficult to assess. These securities were at the epicentre of the financial crisis that started in 2007.

24. Deregulation and mortgage finance innovations have significantly reduced borrowing constraints on households in many countries. As house prices went up, reducing the affordability of housing, financial innovations were used to loosen the financial constraint of households, especially by lowering initial repayments. Such innovations have generated two problems. First, while on an individual basis financial arrangements offering households easier access to credit might be desirable, at the aggregate level they boost demand and hence put further pressure on prices. Second, many financial innovations increase the vulnerability of households through different channels. Delaying the repayment period exposes households to increased interest rate risk. Furthermore, it is likely that not all households fully understand the risks involved in taking, for example, variable rate or interest-only loans. Many borrowers tend to choose mortgages with the lowest repayments, at the expense of higher risk (Lunde *et al*., 2008). The problem is exacerbated in the case of more sophisticated products, such as those offering teaser rates.[21]

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18. Alt-A mortgages refer to a class of loans to borrowers with a good credit score but originated on the basis of more aggressive underwriting than for conforming loans (De Michelis, 2009).

19. In the worst case, so-called NINJA (No Income, No Job, No Assets) loans were extended to households who could not certify an income or a job and had no assets which could have served to guarantee the repayment of the loan. Government initiatives aimed at helping low-income families to obtain mortgages have also supported the development of the US subprime market (Blundell-Wignall *et al*., 2008).

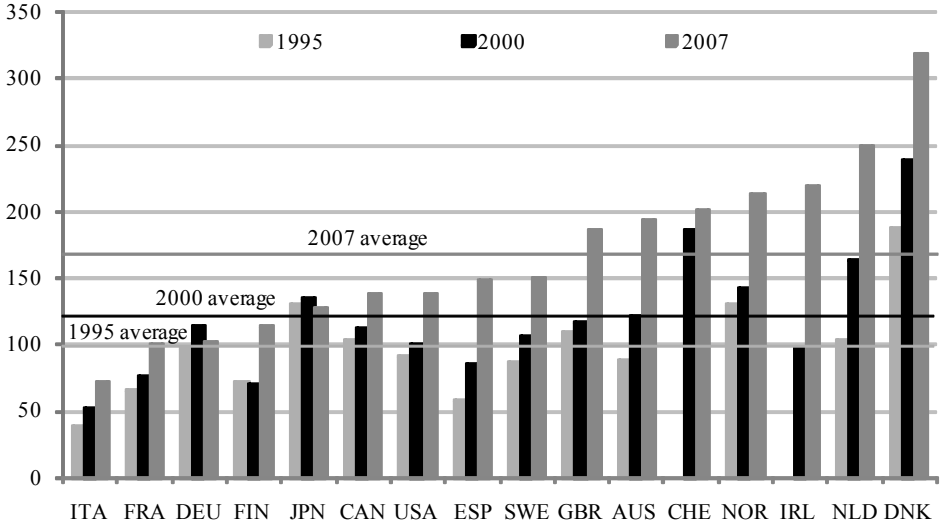
20. Structured products are synthetic investment instruments created to meet specific needs that cannot be met by standardized financial instruments.

21. In these products, the initial interest rate is very low. But after a period of two to three years, it is reset at a much higher level, provoking a jump in the monthly repayment. Such loans were widespread in the United States subprime market.

25. The combination of rapidly rising house prices and easy access to credit has led to a dramatic increase in the level of household debt in most OECD countries over recent years (Figure 6). Average household debt, of which mortgages are the main constituent, represented about one year of household disposable income in 1995. By 2000, debt had risen to about 120% and in 2007 it was close to 170%. High levels of debt increase the vulnerability of households to shocks to income, interest rates and house prices. The level of vulnerability depends on the features of the mortgage contracts as well as on the characteristics of the indebted households. In many cases, a long period of rising house prices has allowed households to build substantial amounts of equity in their homes. Household surveys carried out in various countries suggest that most of the debt is held by higher-income households, who spend a moderate proportion of their disposable income servicing debts (Girouard *et al*., 2006b). However, easier access to credit has also allowed lower-income households to increase their level of debt substantially in some countries, notably the United States. Differing lending standards across countries have resulted in varying proportions of non-performing housing loans since the beginning of the current crisis: while the percentage of mortgages with repayments more than 90 days in arrears has jumped in the United States – to over 5% in June 2009 – and to a lesser extent in the United Kingdom and Spain – to between 2 and 3% – it has so far remained well below 1% in Australia, Canada and France (RBA, 2009; Commission Bancaire, 2009). There is nevertheless a risk that defaults rise further as unemployment has probably not peaked yet.

Figure 6. Household debt

Per cent of disposable income



Note: Averages are unweighted.

Source: OECD National accounts.

Demographics

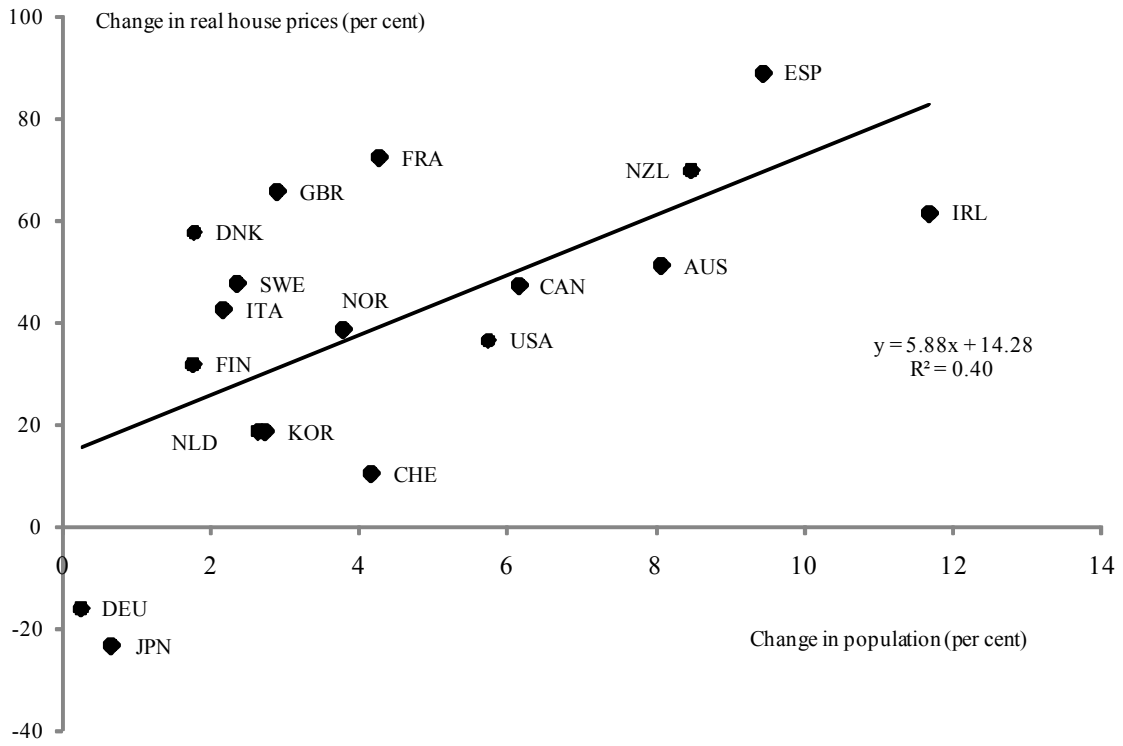
26. Demographic developments are obvious drivers of housing demand. Population growth and especially larger cohorts at household formation age tend to put pressure on house prices in the short term.[22] In the longer term, the impact of population trends on house prices is less clear, as it also depends

22. The only country of the sample examined in this paper where the share of population at household formation age has increased significantly since 2000 is Ireland. In other countries, the demographic impact on house prices over the latest cycle is more likely linked to population growth than to the evolution of the age structure of the population.

on supply responses. In recent years, increases in real house prices across OECD countries have been positively correlated with population growth (Figure 7). Germany and Japan, the two countries with the lowest population growth rates over 2000-06, were the only countries in the sample to experience falls in real house prices over the period. At the opposite, strong population growth – partly due to net migration – in Ireland, Spain, New Zealand, Australia, and to a lesser extent Canada and the United States is likely to have contributed to strong house price appreciation. According to Miles and Pillonca (2008), increases in population have contributed around 35 percentage points in Spain and the United States and more than 70 pp in Ireland to the increase in house prices.

27. In OECD countries, the size of households has generally been diminishing over time, because of a reduction in the number of children per family, increasing numbers of lone-parent families and population ageing accompanied by improved autonomy of elderly people (Heyer *et al.*, 2005). As a result, the number of households has tended to increase faster than the population, contributing to the increase in housing demand.

Figure 7. Increases in population and real house prices
2000 - 2006



Source: OECD and national sources.

Demand by non-residents

28. In a number of European countries, house purchases by non-residents have been significant in recent years. Among the factors influencing these acquisitions are the increased number of retired people in Europe, the creation of the euro, the reduction in transport costs – especially as a result of the expansion of low cost airlines – and the price advantage and attractiveness of some regions. For example, in France, purchases by non-residents represented 9% of residential investment in 2005 (Foncier Expertise, 2006). In Spain, housing investment by non-residents has grown at an annual rate of more than 20% from the end of the 1990s to 2003. At that point, it represented around 10% of total residential investment and about 0.9%

of GDP. Since mid-2004, foreign residential investment has been declining in Spain, probably reflecting prices that have become less attractive, excessive development of some coastal areas and increased competition from countries like Croatia and Bulgaria (Rubio de Juan, 2006). While housing investment by non-residents is generally a modest source of demand, it has probably contributed to amplify price increases in some countries and especially in some particularly attractive regions.

Price expectations

29. Expectations about future prices may play a significant role in shaping housing demand. Home buyers do not generally seem to be primarily driven by prospects of investment returns. The non-pecuniary value households derive from owning their homes seems more important. A recent study by the Building Societies Association (BSA, 2007) in the United Kingdom showed that the primary motives for buying a home were the desire to own (88% of respondents) and the feeling that rental payments were wasted money (77%). Financial gains were important for less than half of the respondents (45%). However, a major concern for would-be homeowners was the risk of being priced out of the market if prices rose (this was a motivation for 28% of first-time buyers and 63% of people considering buying for the first time). Hence, expectations of future price increases can increase demand even in the absence of speculators purely motivated by the prospects of capital gains.

30. A number of studies have shown that house price expectations are, at least to some extent, backward looking.[23] Miles and Pillonca (2008) assume that house price expectations are based both on long-term trends and recent price developments. This hypothesis is broadly confirmed for the United Kingdom by the BSA survey mentioned above. Similarly, in the United States, Shiller (2007) states "that the recent speculative boom has generated high expectations for future home price increases is indisputable." His survey found that the mean expected price increase in 2003 was 9.4% in Los Angeles and 8.6% in Milwaukee.[24] Piazzesi and Schneider (2009), using the results of the Michigan Survey of Consumers, show that the latest housing boom can be divided into two phases. At the beginning of the boom (2002-03), an increasing number of households believed that it was a good time to buy houses, mainly because credit conditions were favourable. After the second quarter of 2003, this number started to decline. But, at the same time, the number of households who believed that prices would continue to rise increased from 10% in the last quarter of 2003 to over 20% – a 25 year high – in the second quarter of 2005.[25] Hiebert and Sydow (2009) provide model-based evidence that variations in expected returns could also have contributed to large and persistent swings in euro area house prices. All these observations suggest that expectations may well have played an important role in the boom, especially in its latest phase, when financing conditions had ceased to improve.

31. For Miles and Pillonca (2008) , the change in expected capital gains has contributed significantly to real house price increases in Spain and Denmark (about 45 percentage points), the United Kingdom (39 pp) and Sweden (54 pp). At the opposite, unfavourable capital gain expectations would have more than offset the contribution of higher real income in Germany.

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23. A review of studies testing housing market efficiency can be found in Cho (1996).

24. The corresponding median expected prices were 10% for Los Angeles and 5% in Milwaukee. Shiller notes that "the Milwaukee housing market had not boomed substantially as of 2003" and concludes that "expectations of home price increase are probably formed from national, rather than local evidence for many people, especially at a time of national media captivation with the real estate boom." On the contrary the BSA study for the United Kingdom finds that "the role of the media in influencing expectations about the housing market is often over-emphasised."

25. Piazzesi and Schneider argue, on the basis of a simple search model of the housing market, that a small number of "momentum traders" can have a large effect on house prices without buying a large share of the housing stock.

32. An area where price expectations are essential determinants of demand is the investment or buy-to-let market. In the United Kingdom, nearly one fifth of the respondents to the BSA survey (2007) had bought or considered buying property for investment in the last twelve months. While 45% of investors were motivated both by the rental income and the prospect of capital gains, 37% only valued the latter. Only 19% were merely interested in rental proceeds. During the latest upswing, the buy-to-rent market also expanded significantly in Australia, Ireland and the United States (Girouard *et al.*, 2006).

3.2. Supply

33. The factors driving housing supply are much less understood than those driving demand (Gyourko, 2009) as housing supply is driven to a large extent by local conditions, in particular the availability of land for building, infrastructure – especially transport – and building regulations.[26] Furthermore, few studies on the behaviour of housing suppliers have been carried out, as micro data are scarce (Di Pasquale, 1999). However, analysing the behaviour of housing supply is crucial to understanding house price dynamics and long-term price levels. Price reactions to demand shocks – such as those produced by shifts in interest rates – fundamentally depend on supply responses. If supply is perfectly elastic, house prices will not durably deviate from marginal production costs, which include construction costs, land costs and a normal profit margin of the homebuilder. If supply is inelastic, demand shocks generate price increases, which can be amplified by backward-looking expectations and lead to the development of bubbles (Glaeser *et al.*, 2008).[27]

34. Supply equations at an aggregate level – *e.g.* national – are generally based on a measure of profitability. They include house prices and indicators of housing production costs, such as wage and capital cost (*e.g.* Di Pasquale, 1999; Swank *et al.*, 2002). Expectations of future house prices are also likely to play an important role in building decisions, as developers can make significant holding gains on land when prices are rising. Unfortunately, not much is known about the behaviour of homebuilders. Altogether, aggregate level equations are often not doing a very good job at explaining housing supply developments. This probably results both from data availability and quality problems and from the importance of local factors in determining housing supply, which makes modelling it at an aggregate level difficult.

35. At the metropolitan level, additional supply determinants include the population of the city, its growth, density and transportation costs (Capozza and Helsley, 1989). Green *et al.* (2005) have estimated housing supply elasticities for forty five US Metropolitan Statistical Areas (MSAs). They find that elasticities vary widely across MSAs, ranging from around zero to more than ten. They also find that heavily regulated MSAs always exhibit low elasticities. These results are in line with those of Glaeser *et al.*

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26. Social housing has also made a sizeable contribution to the supply of dwellings in some countries in the past. However, it is now on a declining trend in most OECD countries (*e.g.* Whitehead and Scanlon, 2007).

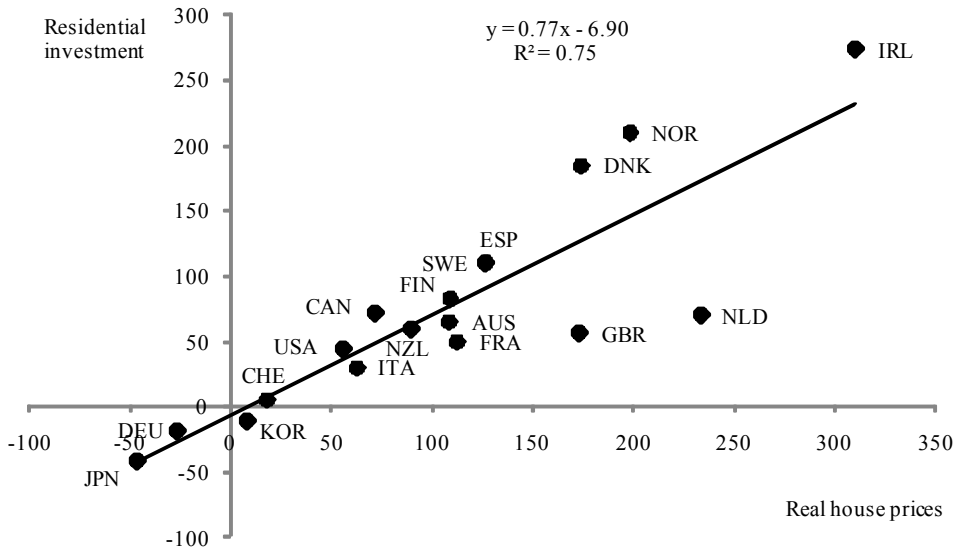
27. The importance of supply in explaining house price dynamics is highlighted by two examples from the literature. Meen (2002) shows that even though "the literature on time-series housing market models in the United States and the United Kingdom would suggest that the two countries operate in very different ways", the same methodological framework can explain the behaviour of house prices in both countries. Differences in real price trends in the two countries are mainly explained by differences in supply elasticities. The debate between Mankiw and Weil (1988) and DiPasquale and Wheaton (1994) provides another interesting illustration of the importance of supply reactions for the long-term path of house prices. The former had predicted – in 1988 – that, because less numerous generations were about to enter the household formation age, real house prices would fall substantially over the two following decades in the United States. DiPasquale and Wheaton argued that "a long run price elastic supply of housing dampens much of the impact of changing demographics" and hence a "long term crash in the housing market (was) quite unlikely".

(2005), who argue that since 1970, the rise in house prices in the United States "reflects the increasing difficulty of obtaining regulatory approval for building new homes", rather than fundamental geographic limitations to increasing supply. There is also evidence of regulation-induced supply rigidities in the United Kingdom (Barker, 2006; Muellbauer and Murphy, 2008) and other countries – *e.g.* Denmark, Finland and the Netherlands (Hoeller and Rae, 2007).

36. Over the last expansion, changes in residential investment have been strongly correlated with variations in real house prices (Figure 8). Supply has responded most strongly to higher prices in Ireland, Spain, Canada and the Nordic countries. But increases in residential investment have also been large in most of the other countries where house prices have been rising. Two exceptions are the Netherlands and the United Kingdom, where the supply response to higher prices has been muted, which is consistent with the supply rigidities in these countries.[28] Residential investment has declined in response to lower prices in Germany and Japan. The contributions of changes in housing supply to variations in real house prices over the last ten years estimated by Miles and Pillonca (2008) are highest for Ireland and Spain (minus 85 and 52 percentage points, respectively) and are also substantial in France, Norway and the United States (minus 21, 23 and 29 pp, resp.). They are smaller for the Netherlands and the United Kingdom (17 and 16 pp, resp.), and also for Denmark, Sweden and Italy (14, 8 and 4 pp, resp.).

Figure 8. Real house prices and residential investment

Percentage change over the latest cyclical phase



Note: The latest cyclical phase corresponds to the expansion that ended in 2006-2007 for most countries (see Table 1). For Japan and Germany, it corresponds to the ongoing downturn.

Source: OECD Economic Outlook 86 database and national sources.

28. Econometric estimates by Swank *et al.* (2002) confirm that the price elasticity of supply is low in the Netherlands and the United Kingdom (resp. 0.30 and 0.45). However, they also report a relatively low elasticity for Denmark (0.66). This might be due to the fact that their sample ends in 1999. Higher elasticities are found for France (1.09), the United States (1.40) and Germany (2.05).

3.3. Fundamentals and house prices

37. Summing up, the analysis of supply and demand drivers suggests that a number of fundamental factors have been essential in driving prices higher in many OECD countries. In particular, favourable financing conditions, higher income and demographic developments have boosted demand in most countries. Rigidities have sometimes prevented supply to adjust and put additional pressure on prices. But unduly optimistic expectations about future house prices are also likely to have played a role in prolonging housing booms. Econometric evidence on the ability of fundamentals to explain recent house price increases is mixed. As noted earlier, Miles and Pillonca (2008) find a significant contribution from expected capital gains to real house price increases in a number of countries.[29] The International Monetary Fund used an econometric model to assess the overvaluation of housing markets. The latest update, released in October 2009, shows overvaluation in excess of 10% in six countries (IMF, 2009a).[30] A few country-specific studies suggest little overvaluation. Meen (2008) finds that "the evidence of a housing bubble in the United Kingdom between 1997 and 2007 is weak, despite the claims of many commentators". His model is able to explain developments in house prices with typical errors in the range of 2 to 3%. Skaarup and Bødker (2009) estimate that nominal house prices in Denmark were 5 to 10% above their equilibrium value by mid-2009. Norges Bank (2009) finds that recent developments in Norwegian house prices can be explained econometrically.[31] Kranendonk and Verbruggen (2008) find no overvaluation in the Netherlands in 2007. Somewhat conflicting results have been found for Spain: while Ayuso and Restoy have estimated that the overvaluation was around 30% in 2004, Sosvilla Rivero (2008) only finds an overvaluation of around 7% in 2007 when immigration flows are taken into account and 14% when the latter are omitted. While econometric models point to house prices being close to their predicted values in many countries, one should keep in mind that variations in the exogenous variables of the models could induce large swings in house prices. For example, income and employment could deteriorate and drag prices down. Moreover, there is always a risk that prices might overshoot on the downside.

4. Housing and the wider economy

38. Developments in housing markets affect economic activity through several channels. Residential investment is a relatively small but volatile component of gross domestic product, which can make a sizeable contribution to economic growth. Housing construction is a labour intensive industry, having a large impact on employment. Housing markets may have an indirect effect on private consumption through a wealth or liquidity effect. Disturbances in housing markets are often a threat to financial stability. Besides, economic policies, especially taxation, monetary policy and financial market regulation and supervision can have a great influence on housing and mortgage market developments.

4.1. Residential investment and employment

39. As shown above, residential investment has responded strongly to rising demand in many countries. Figure 9 shows the evolution of real residential investment, private consumption and GDP since 1991 in our sample of 18 OECD countries. The period covers roughly two business cycles, separated by a mild recession around 2001-02. During the expansion of the 1990s, residential investment generally expanded at a moderate pace. But during the latest expansion, there was a housing investment boom in

29. In addition, they find a positive difference between actual and estimated house prices for the Netherlands (17 pp) and Norway (9 pp) and a negative difference for the United States (-13 pp).

30. Ireland, Italy, United Kingdom, France, Spain and Australia. The maximum overvaluation is about 14% in Ireland. Similar estimates a year ago showed overvaluation in excess of 10% in thirteen countries and over 25% for Ireland, the Netherlands and the United Kingdom.

31. Interestingly, the model shows that a large part of house price falls in 2008 was related to the tightening of credit standards.

many countries, particularly the United States, Canada, Denmark, Ireland, Norway and Spain. Measured as a share of nominal GDP, long-term averages for housing investment are typically in the range of 4 to 6%. At the peak of the cycle in 2006, this ratio reached more than 9% in Spain and 14% in Ireland.

40. The construction sector is very labour intensive. In the countries that experienced the largest increases in housing investment, construction made a sizeable contribution to employment growth. For example, between 2000 and the peak of the market, Ireland had created more than 100 000 construction jobs and Spain around 900 000 – respectively around 7 and 5½ per cent of total employment in 2000. Most of these jobs had already been lost by the second quarter of 2009. During the latest expansion, construction also contributed significantly to employment growth in many other countries, including Finland, France, Italy, Denmark and the United States. Bover and Jimeno (2007) show that the reallocation of labour resources to the construction sector in response to increases in house prices mainly depends on building possibilities – proxied by a corrected measure of population density in their study.[32] Large reallocations of labour between sectors as a result of housing cycles entail important adjustment costs.[33] Besides, a reduction in the affordability of housing in some regions may constitute an important obstacle to labour mobility and affect a country's employment, competitiveness and long term growth.

4.2. Private consumption

41. An increase in the value of houses can lead to an increase in household consumption, via a wealth effect. However, because households both own housing assets and consume the housing services deriving from them, capital gains to the owner are partly or fully offset by the higher discounted value of future imputed rents when house prices rise.[34] Unlike a rise in equity prices, which can reflect an increase in the economy's expected productive potential, and thus of future income, higher house prices may simply reflect increased scarcity owing to higher demand, with no net change in either the quantity or the quality of the services provided. In that case, there would be no change in national wealth. Nevertheless, even if aggregate wealth is unchanged, house price increases usually affect the relative positions of specific groups of people – for example, of current home-owners *vis-à-vis* would-be home buyers. These wealth transfers can have macro-economic effects if these categories' propensities to spend differ. [35]

42. More importantly, the transmission of increases in housing wealth to consumption could be the result of a liquidity effect, operating through housing equity withdrawal. According to the life-cycle theory, consumption depends on households' lifetime income and wealth. In order to keep their consumption level fairly constant over their lifetime, households tend to borrow when they are young and earn a relatively

32. The measure takes into account the population density per square kilometre and the percentage of households living in houses, as opposed to flats. Bover and Jimeno also find that "aggregate labor demand elasticity with respect to relative house prices differs across countries only to the extent that labor demand elasticity in the construction sector varies as well. However, as the share of construction employment is relatively small, this aggregate labor demand elasticity is broadly similar across countries", at around 0.5 – 0.2 in a general equilibrium setting.

33. Problems arising from labour shortages in the tradable goods sector are, however, mitigated in countries where unemployment is high. In addition, in some countries, migrant workers account for a large share of employment in the construction sector.

34. The extent of the offset depends on the owners' effective time horizon, that is, on whether they intend to sell their housing assets during their lifetime or to pass it on to their offspring. If current wealth holders fully internalize the welfare of future generations, so that their economic planning horizon is effectively infinite, the expected cost of future imputed rents fully offsets the value of housing assets.

35. Gstach (2007) presents an analysis of the impact of changes in rental rates on consumption in a panel of OECD countries. Sierminska and Takhtamanova (2007) show using micro-data, that wealth effects vary significantly across age groups.

low income, to repay their debt as they get older and their income increases and finally to accumulate assets which will allow them to maintain their consumption level during retirement. However, in an uncertain world with imperfect financial markets, some households have only limited access to borrowing. Even when available, uncollateralised consumer credit tends to be prohibitively expensive. Since housing assets constitute the most important form of collateral available to households, an increase in their value allows more borrowing to finance current consumption.

43. Several studies have attempted to estimate the magnitude of the impact of changes in housing wealth on consumption. Catte *et al.* (2004) estimate that the long run marginal propensity to consume out of housing wealth is in the range of between 0.05 and 0.08 for Australia, Canada, the Netherlands, the United Kingdom and the United States, while it is between 0.01 and 0.02 in Italy, Japan and Spain and statistically insignificant in France and Germany. These estimates are in line with the literature (*e.g.* CBO, 2007; Muellbauer and Murphy, 2008; Skudelny, 2009). Higher propensities to consume in English speaking countries, where mortgage markets are most developed, than in continental Europe (the Netherlands are an exception) are consistent with the hypothesis that housing equity withdrawal is instrumental in transmitting housing wealth increases into higher private consumption.

44. Since the beginning of the 2000s, private consumption has increased faster than GDP in most English-speaking and Nordic countries (Figure 9). In continental Europe, consumption growth was significantly stronger than GDP growth only in France. During the expansion of the 1990s, which was accompanied by more modest house price increases, consumption had generally been more subdued. Even though many other factors affect consumption, these observations are consistent with the hypothesis of a housing wealth effect on consumption. Higher housing wealth seems to have encouraged households to save less or allowed them to borrow more. Lower household saving rates have contributed to increasing national investment-saving imbalances and hence current account deficits. We will return to this subject in section 4.4, after considering the influence of economic policies on housing market developments.

4.3. The role of policies

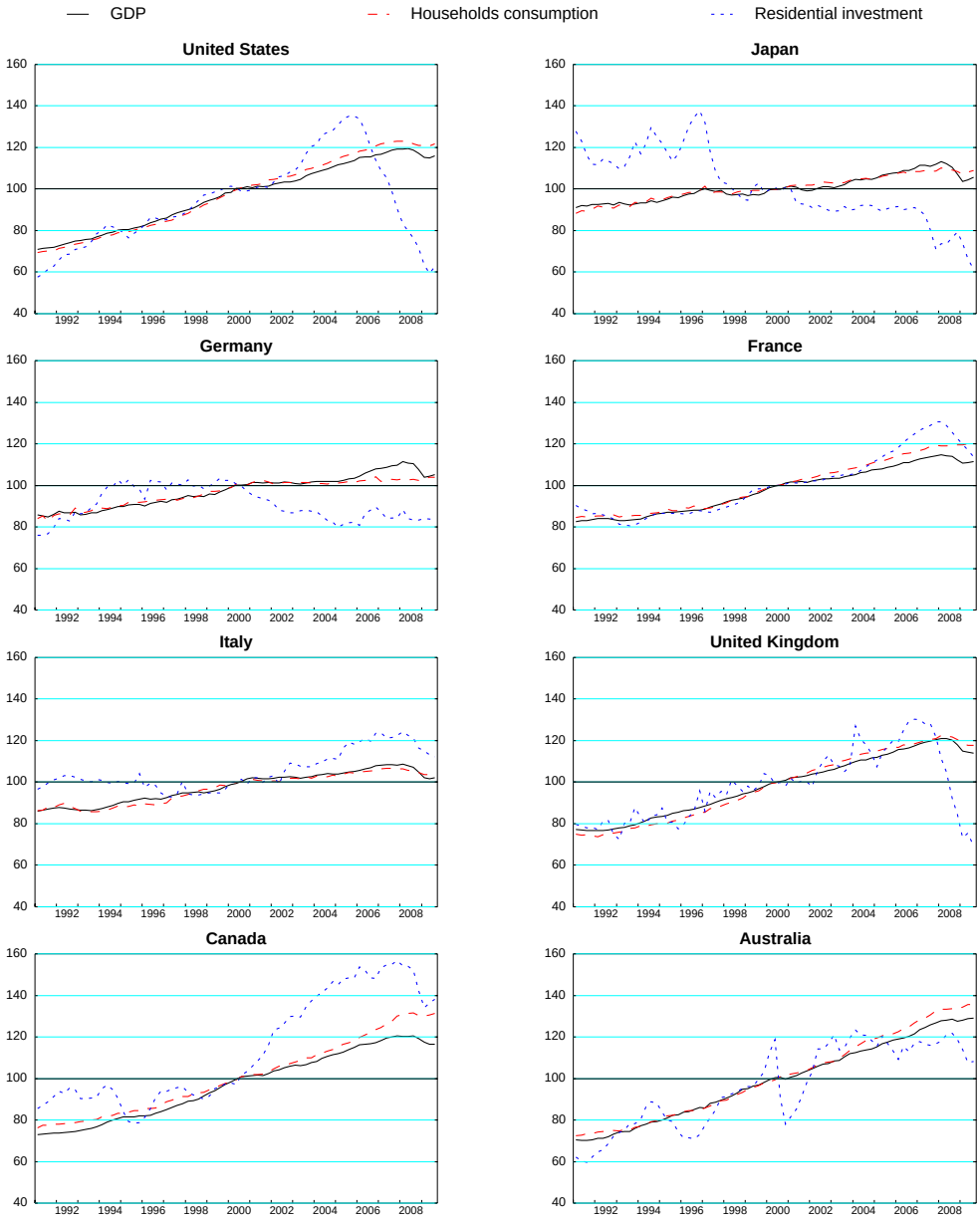
Taxation

45. A variety of taxes, tax reliefs and subsidies affect the housing sector.[36] These fiscal provisions vary greatly across countries, but generally result in a system which is far from neutral, *i.e.* they introduce distortions in market participants' decisions. In particular, there is often a bias in favour of homeownership, which is widely assumed to bring positive externalities. Advantageous tax treatment of housing may also lead to over-investment in real estate and misallocation of capital, with negative effects on long-term economic growth.[37] Two key questions are whether tax advantages achieve their social objectives and whether they might have a destabilising effect on housing markets and the wider economy.

36. This paragraph only gives an overview of the most common tax provisions in OECD countries. For more details, see Scanlon and Whitehead (2004), Wolswijk (2010) and ECB (2009).

37. In general terms, tax systems should avoid distorting tenure choice and allocation of capital between housing and other investments. They should also avoid encouraging excessive household leverage. There are several ways in which broadly neutral taxation can be achieved. For a discussion of the design of tax structures in OECD countries, see Johansson *et al.* (2008).

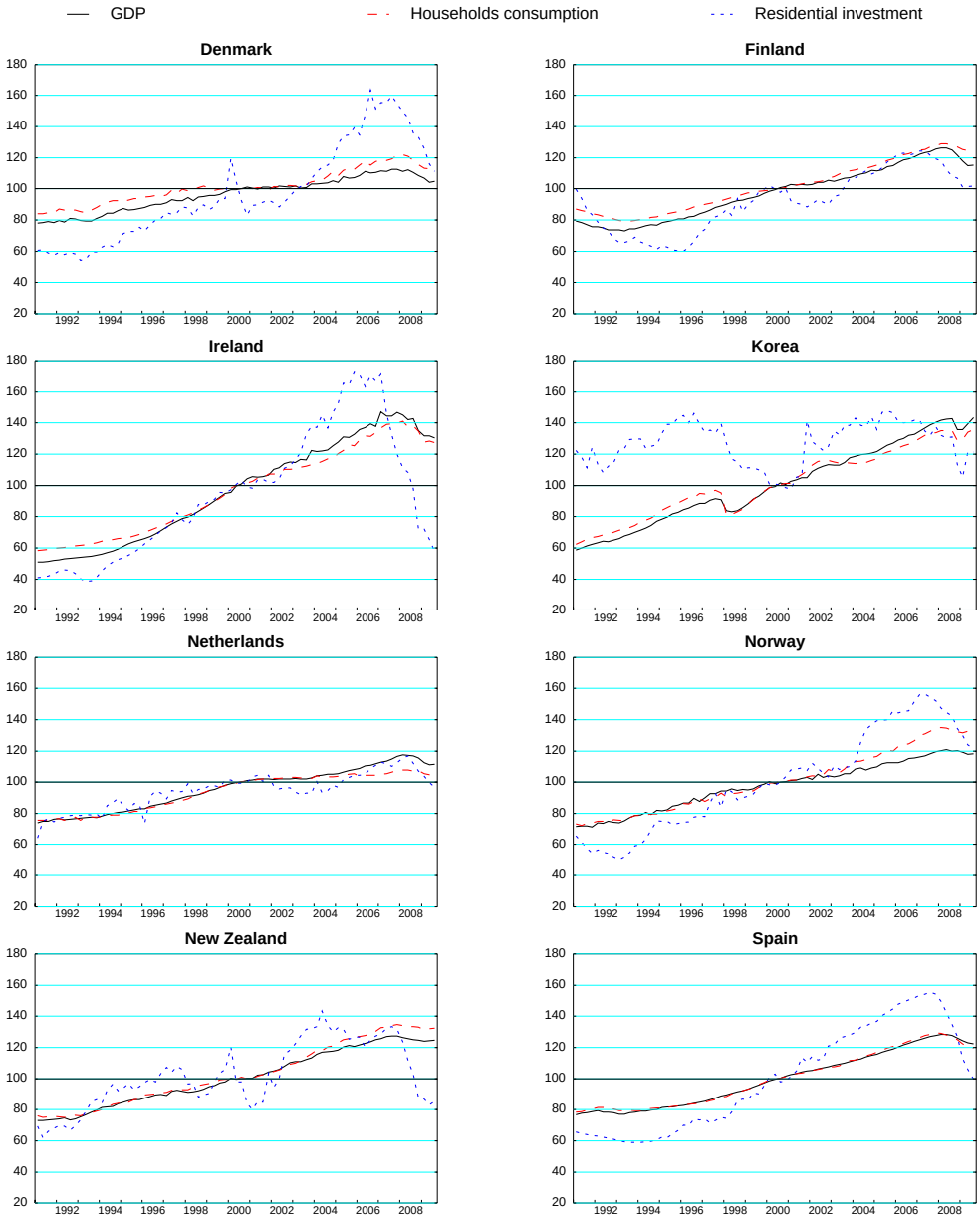
Figure 9. GDP, Households consumption and residential investment
Indices, 2000 = 100



Source: OECD Economic Outlook 86 database.

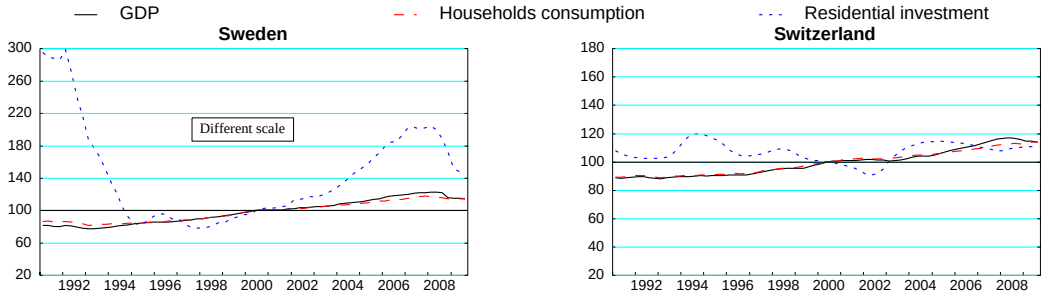
Figure 9. GDP, Households consumption and residential investment (cont.)
Indices, 2000 = 100

Different scale



Source: OECD Economic Outlook 86 database.

Figure 9. GDP, Households consumption and residential investment (cont.)
Indices, 2000 = 100



Source: OECD Economic Outlook 86 database.

46. Three main advantages are granted to homeowners in a majority of countries:

- *Imputed rents are generally not taxed:* in a majority of OECD countries, there is no tax on imputed rents received by homeowners. This means that the latter pay their rent out of pre-tax income, while tenants pay their rent out of after-tax income. This tax advantage can be, however, mitigated or offset by the imposition of property taxes on homeowners.

- *Mortgage interest tax relief:* in many OECD countries, mortgage interests related to the main residence are deductible from personal income tax. In Spain, principal repayments are also deductible up to a certain level. In recent years, the tax advantage derived from interest deductibility has tended to diminish as a result of the general decline in nominal interest rates and marginal tax rates. Furthermore, some countries have reduced the tax relief (Denmark and Sweden). The United Kingdom has progressively reduced the tax deduction until abolishing it in 2000.[38]

- *Exemption from taxes on capital gains:* most OECD countries apply capital gains taxes to residential property but a majority exempt owner-occupied dwellings that are the owner's main residence, sometimes under the condition that the property is held for a minimum number of years – *e.g.* Finland and Germany – or that the proceeds are reinvested – *e.g.* Spain.

47. Other taxes also affect the structure and functioning of housing markets:

- *Property taxes:* low property taxes may encourage homeownership. Property taxes are generally rather unrelated to the evolution of house prices. An exception was Denmark, where the property tax rate used to be revised annually, contributing to macroeconomic stabilisation, but the calculation basis for the property value tax was frozen in 2002 (Muellbauer, 2006).

- *Taxes on transactions:* a number of taxes – stamp duties, transfer and cadastral taxes, VAT – are levied on housing transactions. These taxes vary widely across countries and usually account for a large share of the acquisition costs (EMF, 2006). Higher transaction costs have adverse effects on the economy as they reduce the mobility of households. But they can also limit speculative transactions. In Ireland, stamp duties have been used to restrain housing demand, with mixed results (OECD, 2006).

38. Bucking the trend, France has reinstated limited mortgage interest relief in 2007.

48. Whether tax advantages granted to homeowners are effective at achieving their social objectives – mainly ensuring access to housing at a reasonable cost – is questionable. As tax advantages increase demand for housing, they tend to increase the level of house prices, offsetting part of the tax advantage. The extent of the offset depends on the price elasticity of housing supply. In countries where supply is rigid, a great part of the tax subsidy is likely to be capitalised into house prices.[39] As a result, the improvement in affordability is limited. Moreover, housing-related tax advantages are usually regressive in terms of redistribution and costly for the government budget.

49. Tax advantages not only raise equilibrium house prices but may also increases price volatility. Demand and supply shocks affecting the housing market are likely to be amplified compared to the situation that would prevail in the presence of a neutral tax system. Van den Noord (2005) demonstrates that, in the presence of backward-looking expectations, a tax system which subsidises homeownership tends to increase house price volatility. He shows that euro area countries with the highest subsidies for homeownership – Finland, Ireland, Netherlands and Spain – have the most volatile house prices. Similarly, Swank *et al.* (2002) find that house prices are most volatile in countries where homeownership is subsidised, the price elasticity of housing supply is low and loan-to-value (LTV) ratios on mortgages are high.[40]

50. The tax deductibility of mortgage interest payments also tends to encourage households to keep LTV ratios high. While traditional amortising mortgages imply regular repayments and – assuming that house prices are not falling – a progressive decline of the LTV ratio over the life of the mortgage, innovations in mortgage finance – *e.g.* interest-only loans, flexible repayment mortgages, cash-out refinancing of mortgages – allow households to maintain high levels of debt for longer periods, making them more vulnerable to macroeconomic shocks or falls in house prices. A consequence of higher LTV ratios is an increase in the proportion of mortgages at risk of falling into negative equity – *i.e.* owning a property that is worth less than the amount of the loan to repay – in the case of a fall in house prices. The latest housing crisis in the United States has seen a large number of households falling into negative equity (Ellis, 2008). Residential mortgages in the United States are often non-recourse loans. In the event of default, the lender can foreclose the property used to secure the loan, but can make no further claim on the borrower. Households with negative equity have thus an incentive to walk away from their homes. The resulting increase in foreclosures depresses house prices further, driving more homeowners into negative equity and eventually into foreclosure. As foreclosures increase, financial market stress intensifies.

51. Finally, the existence of well-functioning rental markets could help reducing the volatility of house prices. When house prices rise relative to rents, an increasing share of households should opt for renting, thereby reducing pressures on prices. However, a scarcity of rental housing can prevent households from renting. It is worth noting that two of the countries that experienced large housing booms – Ireland and Spain – have very thin rental markets. In contrast, Germany and Switzerland, which have not participated in the latest house price boom, have large rental markets.[41] Hilbers *et al.* (2008) find a positive

39. Berger *et al.* (2000) estimate that, in Sweden, interest subsidies are fully capitalised into house prices. Brounen and Neuteboom (2008) – quoted by Wolswijk (2010) – find that, in the Netherlands, almost 75% of the subsidy is capitalised into prices. Durning and Quigley (1985) find that financing subsidies were capitalised in house prices at a rate of about 20% in a particular market in the United States (greater Little Rock, Arkansas in early 1982). Though one needs to be careful in generalising this result, it seems consistent with a higher price elasticity of supply in the United States than in Sweden and the Netherlands.

40. The study is based on Denmark, France, Germany, the Netherlands, the United Kingdom and the United States.

41. On the German rental market, see ECB (2009). For a description of the Spanish rental market, see Pareja-Eastaway and Sánchez-Martínez (2010). On housing tenure, see Scanlon and Whitehead (2004) and

correlation across European countries between homeownership rates in 2004 and property price appreciation over the period 1990-2004. While many factors affect tenure choices, tax systems biased towards homeownership, often coupled with tight regulation of rental markets have led to a decline of supply of rental accommodation, both in terms of quantity and quality, in many countries. More neutral tax systems should allow a better balance between tenures, which could produce more stable housing markets.[42] Nevertheless, it should be noted that the path towards a more neutral tax system needs to be progressive to avoid disruptive adjustments in house prices.

Monetary policy

52. Housing and mortgage markets can play an important role in the monetary policy transmission mechanism (Aoki *et al.*, 2002; Ahearne *et al.*, 2005; Calza *et al.*, 2009; André and Girouard, 2010). Financial innovations have probably reinforced the role of mortgage markets in the monetary transmission mechanism in the early 2000s (Catte *et al.*, 2004; IMF, 2008). Lower interest rates make housing more affordable and increase demand for houses, boosting residential construction. Strong demand results in higher house prices and housing wealth, allowing households to withdraw housing equity to finance consumption. Resilient private consumption and residential investment have cushioned the downturn in 2001, especially in English-speaking countries. But persistently low interest rates have also fuelled housing booms, which gathered momentum as a result of backward-looking expectations and the pro-cyclicality of financial systems.[43] The financial crisis which ensued has revived the debate on the role of monetary policy in asset price cycles and on the need to introduce asset price developments into central banks reaction functions.

53. While it is natural for central banks to react to asset price developments insofar as they provide useful information on future production and inflationary pressures, there is a debate among economists and policymakers on whether monetary authorities should try to moderate asset price fluctuations, a policy usually called "leaning against the wind".[44] It is generally accepted that three conditions would need to be met to justify "leaning against the wind" (*e.g.* Kohn, 2006): monetary authorities need to be able to detect the development of a bubble at an early stage; a modest tightening of monetary policy has to be effective at controlling speculation; and it must be less costly in terms of medium-term macroeconomic performance to "lean against the wind" than to "clean up the mess" – by lowering interest rates and providing ample liquidity – once the bubble has burst.

54. Detecting housing bubbles with a reasonable degree of certainty in real time is problematic. Large price increases are not necessarily associated with a bubble. One third of the major price increases which have taken place in OECD countries since 1970 have not been followed by sharp declines. Price increases can be the result of a favourable evolution of fundamentals, but these can be difficult to observe

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Erlandsen *et al.* (2006). Gstach (2010) presents stylised facts about rental markets and discusses the role of rental housing in macroeconomic analysis.

42. Priemus and Maclennan (1998) argue that "private rented housing can play a role in dampening overheating in the owner-occupied housing market, and may facilitate labour mobility".

43. Hoeller and Rae (2007) provide model-based simulations that suggest that "backward-looking or extrapolative expectations in the housing market can be highly destabilising as temporary shocks are magnified and create large and long-lasting housing market bubbles that in turn lead to substantial swings in economic activity and inflation".

44. It is referred to asset prices in general as the issues are broadly similar regarding housing and financial asset bubbles. However, the fact that housing crises tend to have a deeper impact on the economy and the financial system than stock-market crises (see below) could justify paying special attention to housing bubbles (*e.g.* Mishkin, 2008).

or to interpret in real time.[45] Hence, detecting bubbles in real time remains very challenging. However, though no single indicator can identify a bubble with certainty, a number of statistics can point to unsustainable developments. Large deviations of housing affordability and price-to-rent ratios from their historical norms are generally reversed at some point (Girouard *et al.*, 2006a; Ahearne *et al.*, 2005). Residential investment booms very rarely end in soft landings (Hoeller and Rae, 2007). Housing booms are usually associated with strong credit growth (Detken and Smets, 2004; ECB, 2005). More generally, housing booms are often accompanied by internal and external economic and financial imbalances, which economic policies could try to address in a flexible way.[46]

55. Another concern is about the ability of monetary policy to thwart the development of a housing bubble without causing widespread damage to the rest of the economy. In a house price boom, prices increase strongly – often at double digit rates – and expectations of future prices are similarly upbeat. Under these conditions, large policy rate hikes would be necessary to cool housing markets. High interest rates would crowd out sound and socially useful investments (Kohn, 2006). An additional difficulty for large countries and monetary unions is that housing market developments usually differ across regions or member countries. For example, during the latest housing boom, while prices were soaring in States like Florida or California, they were stagnating in many other parts of the United States. In the euro area, prices were skyrocketing in Spain and Ireland, but declining in Germany.[47] Devising an appropriate monetary policy response to asset price developments under these conditions is not easy.

56. Given the difficulty of detecting bubbles in real time and the potential need to hike interest rates substantially to prevent asset price bubbles, it has often been argued that monetary policy should "clean up the mess" – by lowering interest rates and providing ample liquidity – once the bubble has burst, rather than trying to act preventively.[48] Recent events have shown how difficult it can be to revive an economy after a housing and financial market collapse. But precedents existed. Japan's economic growth has been anaemic since its housing and financial bubble burst in the early 1990s.[49] Several Nordic countries also experienced deep housing and financial crises in the early 1990s, but recovered more quickly. More generally, most large downturns in house prices in OECD countries since 1970 have been associated with sharp slowdowns in GDP and household consumption growth (Figure 10). An International Monetary Fund study on developed countries in the post-war period finds that on average housing market related contractions last twice as long as those linked to stock market crashes and output losses are twice as large – about 8% after three years against 4% for stock market crises (IMF, 2003).[50]

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45. Gurkaynak (2005) shows that, despite recent advances, econometric detection of asset price bubbles cannot be achieved with a satisfactory degree of certainty.

46. The influence of financial imbalances on future inflation is one of the justifications for the monetary pillar of the ECB (ECB, 2005).

47. Vansteenkiste (2007), using a global VAR model, finds variable and generally moderate house price spillovers across US States. Vansteenkiste and Hiebert (2009), using the same methodology, find that cross-country house price spillovers in the euro area are much smaller than those across states in the United States. Ferrara and Koopman (2009) find no strong common housing cycle in the euro area. De Bandt *et al.* (2009), using a FAVAR model, find a global factor affecting house prices, driven by shocks originating in the United States.

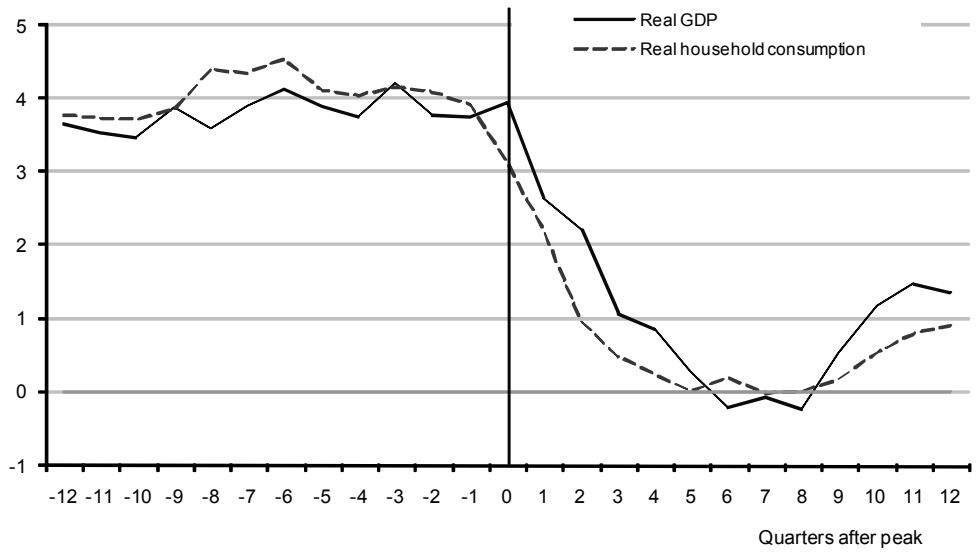
48. This view was prevalent among US Federal Reserve officials before the start of the latest financial crisis. Recent views expressed on the issue include Mishkin (2008) and Yellen (2009).

49. Japan's slow recovery is generally attributed to inadequate initial monetary policy responses and structural weaknesses of the financial system (*e.g.* Kohn, 2006).

50. Cecchetti (2006), Detken and Smets (2004) and ECB (2005) also emphasize the high costs of recessions associated with falls in house prices.

Figure 10. Real GDP and consumption during major housing downturns

Year-on-year percentage change



Note : Average growth during major downturns in housing prices in a selection of 18 OECD countries. Major downturns are defined as price falls exceeding 15% in real terms, cumulatively over a period of at least 6 quarters (see Table 1).

Source : OECD Economic Outlook database and OECD calculations.

57. Housing crises usually have a great impact on private consumption because they lead to a deterioration in the balance sheet of homeowners, which represent a large fraction of households, whereas stock market crashes directly affect fewer households, as financial wealth is more concentrated among the wealthiest households.[51] In addition, housing often makes up a large share of a household's assets and housing investment is more leveraged than investment in equities. Moreover, as mentioned earlier, housing constitutes the most important form of collateral available to households to secure loans. The large macroeconomic impact of housing crises is also linked to the fact that they are often concomitant with banking crises (Detken and Smets, 2004). The consequences of housing crises for the wider economy should call for preventive action. Prudent monetary policy can help avoid fuelling asset price booms, but adequate prudential regulation and banking supervision is also essential. Before turning to these issues, it is worth saying a few words about the heated debate on the responsibility of monetary policy in the latest housing boom in the United States.

58. Taylor (2007) has argued that if the federal funds rate had been set according to a Taylor rule in the past few years, much of the housing boom in the United States would have been avoided.[52] Greenspan (2009), the former Federal Reserve chairman, has responded that the rate which matters for house prices is the rate on long-term, fixed-rate mortgages, not the federal-funds rate. Since the beginning of the decade, these two rates have become decoupled. Long-term rates have remained unusually low as a consequence of the excess savings generated by China and other emerging economies. It is these low long-term rates, not monetary policy, which would be responsible for the global housing boom. Though Greenspan's argument about long-term rates is irrefutable, it might not exonerate monetary policy completely. Much of the innovations in mortgage markets, in particular in the US subprime market, were dependant on short-term

51. These households' consumption is also presumably less sensitive to short-term variations in wealth, especially if, given the volatility of financial markets, they are perceived as largely transitory.

52. Ahrend *et al.* (2008) also provide evidence that policy rates that are persistently and significantly below what a Taylor rule would prescribe are associated with increases in asset prices, especially housing.

financing, which is directly affected by monetary policy (Arestis and Karakitsos, 2010). Moreover, Adrian and Shin (2008) show that financial intermediaries' balance sheet growth and leverage are closely related to the monetary policy stance. One can also argue that monetary policy has contributed, along with fiscal policy, to an excessively expansive macroeconomic policy stance, thereby worsening internal and external economic imbalances, which bear some responsibility in the current crisis.

Regulation and supervision

59. The deep financial crisis has exposed many weaknesses in the regulation and supervision of the global financial system. The debate on the way to improve regulation and supervision is ongoing and its scope is much broader than housing finance.[53] But the role of the US subprime market in triggering the crisis calls for a review of housing-related regulation and supervision issues. While these are complex and often country-specific, the current paper outlines general features which are essential for the stability of housing finance and the broader financial system.

60. Lending and risk taking tend to be pro-cyclical as economic agents become more confident and sometimes complacent in good economic times (Minsky, 1992).[54] An additional mechanism is the financial accelerator. Easier access to credit allows housing demand to expand, putting pressure on house prices. In turn, high house prices increase the wealth households can use as collateral to borrow further (Bernanke *et al.*, 1998; Aoki *et al.*, 2002). In a similar way, in a system where balance sheets are marked to market, financial institutions eager to raise their leverage – which boosts their expected financial returns – are encouraged to take on more debt and make more investments as asset prices increase. Indeed the leverage of US financial institutions is pro-cyclical. Financial institutions adjust their leverage using repurchase agreements (Adrian and Shin, 2008). This strategy amplifies credit and asset cycles, but also generates serious liquidity risks. If investors lose confidence in the collaterals used in the repurchase operations, financial institutions become unable to roll-over their debt and need to reduce their balance sheets. But such deleveraging leads to fire sales which drive asset prices down and undermine confidence further.

61. The latest financial crisis illustrates this mechanism in a dramatic way. When house prices started to fall in some US States around the end of 2006, it became evident that the expansion of the subprime market was unsustainable. Investors lost confidence in securities backed by mortgages, especially structured products, whose underlying risks became virtually impossible to assess. Money market mutual funds in particular withdrew from the asset-backed securities market to avoid risking losses (White, 2009). The failure of Lehman Brothers in September 2008 practically froze the money market and forced monetary authorities to take exceptional steps to avoid a collapse of the financial system. The crisis spread outside the United States as a number of foreign banks – especially European – were holding significant amounts of US "toxic" products. In addition, a number of institutions which relied on short-term funding to finance long-term loans – *e.g.* Northern Rock in the United Kingdom – came under considerable stress and some had to be bailed out by governments. The financial crisis, which had started in a relatively small segment of the United States mortgage market – at the end of 2007, subprime mortgage backed securities (MBS) accounted for 7% of outstanding mortgage loans, with Alt-A MBS accounting for another 9% (De Michelis, 2009) – ended in the worst recession since the Great Depression.[55]

53. For a more general overview of the issues involved and improvements in financial regulation that are being implemented, see FSB (2009).

54. An additional reason for excessive risk taking by banks is the moral hazard associated with the implicit government guarantee provided to banks considered as "too important to fail" (King, 2009).

55. A more detailed analysis of the financial crisis is provided by Blundell-Wignall *et al.* (2008).

62. The intensity of the financial crisis and the speed of the contagion from the US subprime market to other financial markets have surprised most observers and exposed the fragility of the US and global financial system. Failures in regulation and supervision also became apparent. Financial institutions were permitted excessive risk-taking and leverage. Banking regulations – in particular the Basel agreements on bank regulation – should have ensured that banks held adequate capital. But recent years have seen a dramatic growth in the share of financial assets held outside the traditional banking system, in particular in investment banks, structured investment vehicles, conduits and hedge funds.[56] Many commercial banks have contingency commitments to provide liquidity to off-balance-sheet vehicles they have sponsored. These developments have, at the same time, increased the leverage of the financial system and liquidity risks.

63. Financial regulation should be designed to attenuate the inherent pro-cyclicality of financial systems. But capital requirements under Basel II tend to be pro-cyclical, as fixed minimum capital requirements under Basel I have been replaced by capital standards based on risk-weighted assets. An underestimation of risks during upswings would result in lower capital needs. On the contrary, a deterioration of a bank's portfolio would imply higher capital requirements. Bank provisioning also tends to be pro-cyclical (Hoeller and Rae, 2007). Most provisioning methods are backward-looking, *i.e.* future default rates are simply assumed to be similar to those observed in the recent past. An exception is Spain, where a "dynamic provisioning system" has been put in place, where estimated future losses depend on past losses evaluated over a whole business cycle (White, 2009). Though "dynamic provisioning" has not prevented a housing boom from occurring, Spanish banks seem to have withstood the crisis reasonably well so far. Rating agencies also tend to issue ratings on the basis of past defaults rather than perform forward-looking assessments, and therefore are prone to underestimating risks during expansions. Overall, financial regulation has failed to limit the pro-cyclicality of the financial system and has even perhaps added to it.

64. Financial crises have often followed deregulation of financial markets in the past – *e.g.* in some Nordic and Asian countries. Regulatory developments have also played a part in recent events in the United States. For instance, greater limits imposed in 2004 on lending by Government Sponsored Enterprises (GSEs) – Fannie Mae and Freddy Mac – prompted banks to create their own securitisation structures, which are at the root of the financial crisis. Regulatory changes allowed investment banks to escape stringent rules on leverage ratios. The abrogation of the Glass-Steagall act in 1999 allowed US commercial banks to expand their investment activities, putting them on par with European universal banks. Many US commercial banks and European universal banks suffered huge losses on market activities, causing concern about the safety of bank deposits, which compelled many governments to enhance deposit guarantees. As financial deregulation often has unintended effects, financial authorities must be very alert to preserve financial stability after regulatory changes.

65. The originate-to-distribute model should, in general, support the development of stable housing finance, as it provides funding for mortgages and allows the distribution of risks among a wide range of investors (Schnure, 2005; Green and Wachter, 2007). However, recent developments in the United States have exhibited undesirable characteristics that contributed to the financial crisis. Securitisation of mortgages had been a central feature of housing finance in the United States since the Savings and Loans crisis of the 1980s. Until a few years ago, the market consisted mainly of prime mortgages securitised by GSEs. The reliance on a national, market-based system of securitised mortgage finance – as opposed to a system where mortgages were mainly granted by local and regional depository institutions – has been widely credited for bringing stability to the housing market (Gordon, 2005). But between 2004 and 2006, subprime mortgage originations reached levels in excess of 500 billion dollars per year and close to 20% of

56. Geithner (2008) estimates that in early 2007 the combined assets of such structures amounted to more than $10 trillion, which was roughly equivalent to the total assets of the US banking system.

total mortgage originations. These loans were generally securitised and mortgage-backed securities often became underlying assets for structured financial products.[57] The whole process was plagued by asymmetries of information, perverse incentives and conflicts of interest: underwriting standards were relaxed as risks could be transferred to investors; risks associated with opaque structured products were difficult to assess; rating agencies receiving fees from the issuers of the securities they rated were inclined to underestimate risks; and compensation structures within financial institutions encouraged excessive risk taking and short-termism. These issues need to be addressed if confidence in US mortgage-backed securities is to be restored.

66. Securitisation of mortgages has been less important outside the United States. While more than two thirds of mortgages are securitised in the United States, in other OECD countries the share of securitised mortgages rarely exceeds 20% of total outstanding mortgages (De Michelis, 2009). In the euro area, it has been estimated at 7% in 2007. Furthermore, in some countries – *e.g.* Spain, which accounted for nearly half of euro areas securitisations in 2007 – it is not easy for banks to remove the loans from their balance sheets, making securitisation a pure funding device, reducing the perverse incentives inherent in the originate-to-distribute model. Similarly, covered bonds provide long-term funding to mortgage lenders, but without removing the assets from their balance sheet. In some European countries, notably Germany and Denmark, banks have been issuing covered bonds to fund mortgages for a long time. Recently, issuance of mortgage covered bond rose spectacularly in Spain and, to a lesser extent, France (ECB, 2009).

67. The events of the past two years call for a review of financial institutions risk-management procedures. More attention needs to be paid to contagion effects and liquidity issues in times of acute crisis. Financial authorities need to better control systemic risks. As the global financial system has become increasingly integrated, enhanced international cooperation is essential. The current section has highlighted a number of areas where improving regulation and supervision is crucial. But finding the adequate level and design of regulation will always be challenging. Policymakers need to avoid a regulatory overreaction, which would discourage legitimate activity and push risky activities into the shadows.[58]

4.4. Globalisation, current account imbalances and housing markets

68. At this point, it is necessary to look at housing market developments in a wider context. Over the past fifteen years, the economy has become increasingly globalised. International trade imbalances have widened considerably, especially between the United States and China, Japan and oil exporters (Obstfeld and Rogoff, 2009). Some smaller countries – *e.g.* Ireland, Spain, Australia and New Zealand – have also experienced large current account deficits over recent years. The counterparts of current account deficits are capital inflows, which often played a major role in fuelling housing booms.

69. In the United States, as discussed in section 4.2, increased housing wealth has lead to strong private consumption growth in spite of more modest income increases. The evolution of the households' saving ratio has mirrored that of net household wealth (Figure 11, Panel A). US consumers have used a

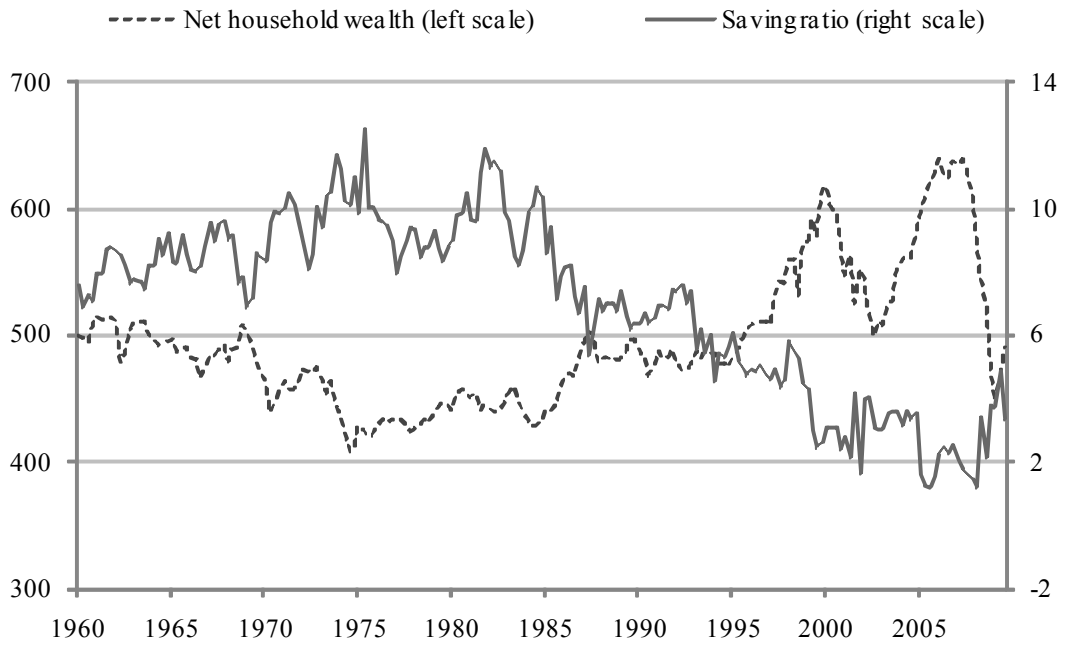
57. These structures often involved insurance through credit default swaps (CDS). Insurers have largely underestimated risks and were generally under-capitalised. The main participant in the CDS market, AIG, had to be bailed out by the US government.

58. Similarly, product innovation should not be systematically discouraged. Miles and Pillonca (2008) and Shiller (2009) have outlined products, which could meet borrowers' needs better than mortgages currently available and bring more stability to housing finance. Nevertheless, regulators should make sure that new products do not simply improve the apparent affordability of loans, while increasing the risks for the borrower.

Figure 11. Households savings and external imbalances

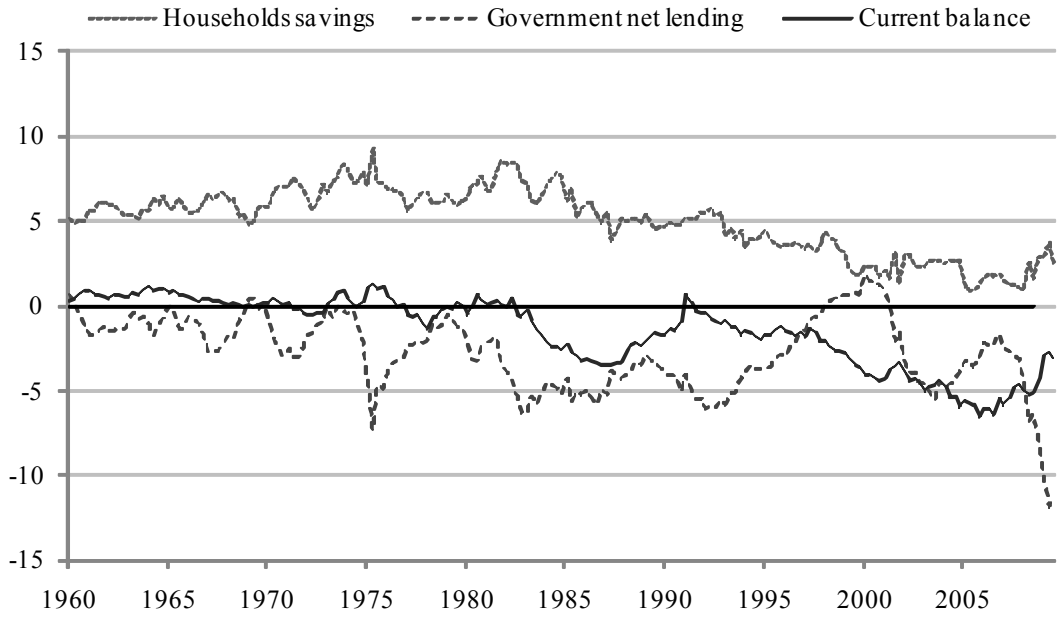
A. Households wealth and saving ratio

Per cent of households disposable income



B. Households savings, government deficits and current account

Per cent of GDP



Source: U.S. Federal Reserve and OECD Economic Outlook 86 database.

large part of their increased equity in their homes to finance consumption.[59] The demand for consumer goods has increasingly been met by imports, largely from China and other emerging countries. Since the early 1990s, the deterioration of the current account balance has followed the decline in household saving closely (Figure 11, Panel B). Though government deficits have also contributed to saving-investment imbalances, their correlation with current account deficits is much less clear than for private savings. Still, tighter fiscal policy would have helped moderating the growth of domestic demand.

70. Since China and other emerging countries have very high saving rates and central banks intervene to prevent their currencies from appreciating, higher demand for exports has translated into huge trade surpluses in some of these economies. For a large part, emerging countries have been recycling their trade surpluses into the United States government bond market and in the market for mortgage-backed securities.[60] As mentioned above, the "savings glut" and the related large inflows of capital from abroad have kept interest rates low in the United States, even after the Federal Reserve had started raising policy rates in mid-2004. Rising mortgage rates would have restrained house price increases, even if some State and local markets had already gathered their own momentum. In addition to lowering interest rates, abundant capital has raised risk appetite. Risk premiums have declined on a number of asset classes, ranging from equities to corporate and emerging market bonds (Kennedy and Sløk, 2005). The widespread underestimation of risks was also a condition for the rapid growth of the subprime market. To sum up, persistently low interest rates combined with lax underwriting standards in the mortgage market and underestimation of risks by investors allowed house prices to rise further. In turn, higher house prices translated into increases in household wealth, which reduced savings, increased the trade deficit and capital inflows, keeping interest rates low and so on.

71. Even though the United States constitutes a special case because of the status of the dollar as the main reserve currency, it is not the only country where a housing boom has been, at least partly, fuelled by foreign capital. Higher demand for houses triggers a reallocation of resources from the tradable goods sector to construction, potentially weakening the competitive position of a country. As demonstrated earlier, housing wealth effects tend to boost consumption. These two channels combine to weaken the current account balance.[61] In our country sample, there is a strong negative correlation between increases in real house prices and changes in current account balances during the latest expansion (Figure 12).[62] Housing booms in Spain and Ireland coincided with large current account deficits – respectively 10 and nearly 5½ per cent of GDP in 2007. Monetary union membership facilitated the financing of external deficits. But some European countries outside the euro area, like the Baltic countries and Iceland, also registered large capital inflows, which fuelled housing booms.[63] This was also the case in Australia and New Zealand, where current balance deficits have reached record levels, at around, respectively, 6 and 8% of GDP in 2007. At the opposite, Germany and Japan, the only two countries where real house prices

59. According to Jagannathan *et al*. (2009), home equity rose only by 29 cents for a dollar increase in house prices during the 2000-07 period, compared with 52 cents between 1980 and 2000.

60. In 2000, China held $92 billion in US assets; in 2007, $922 billion, of which roughly $466 billion in Treasuries and $376 billion in Agency debt (Jagannathan *et al*., 2009). For an extensive description of the recycling process, see Brender and Pisani (2009).

61. Gete (2008) shows that a model featuring labour reallocation across sectors and consumption smoothing between housing and tradable goods can explain recent developments in current account imbalances in a sample of OECD countries fairly well. Two implications of the model are that trade deficits arise during housing booms and that housing booms are larger in countries which can run trade deficits.

62. Obstfeld and Rogoff (2009) document a similar relation on a wider sample of 43 mature and emerging countries.

63. On housing market developments in Estonia, see Brixiova *et al.* (2009).

declined between 2000 and 2007, registered large current account surpluses during the period – respectively 8 and nearly 5% of GDP in 2007.

72. Globalisation has weakened or hindered a number of mechanisms, which could have led to a correction of internal imbalances between saving and investment and limited unsustainable developments in housing markets. First, in an economy with limited cross-country capital flows, low saving relative to investment causes, everything else equal, an increase in interest rates. Higher interest rates tend to reduce investment and consumption – both through the borrowing cost and the wealth channel. In turn, weaker domestic demand reduces imports and improves the current account balance. As shown earlier, in recent years, capital inflows have kept interest rates low across the OECD area.

73. Second, high demand for consumption goods generally generates upward pressures on consumer prices. But cheap imports from China and other emerging economies have helped containing price pressures. Fierce competition has limited wage increases, despite decreasing unemployment. Towards the end of the boom, headline inflation has increased as a result of soaring energy prices. However, well anchored inflation expectations have prevented a spill-over to core inflation.[64] Low and stable inflation has allowed central banks to keep an easy monetary stance for a prolonged period.

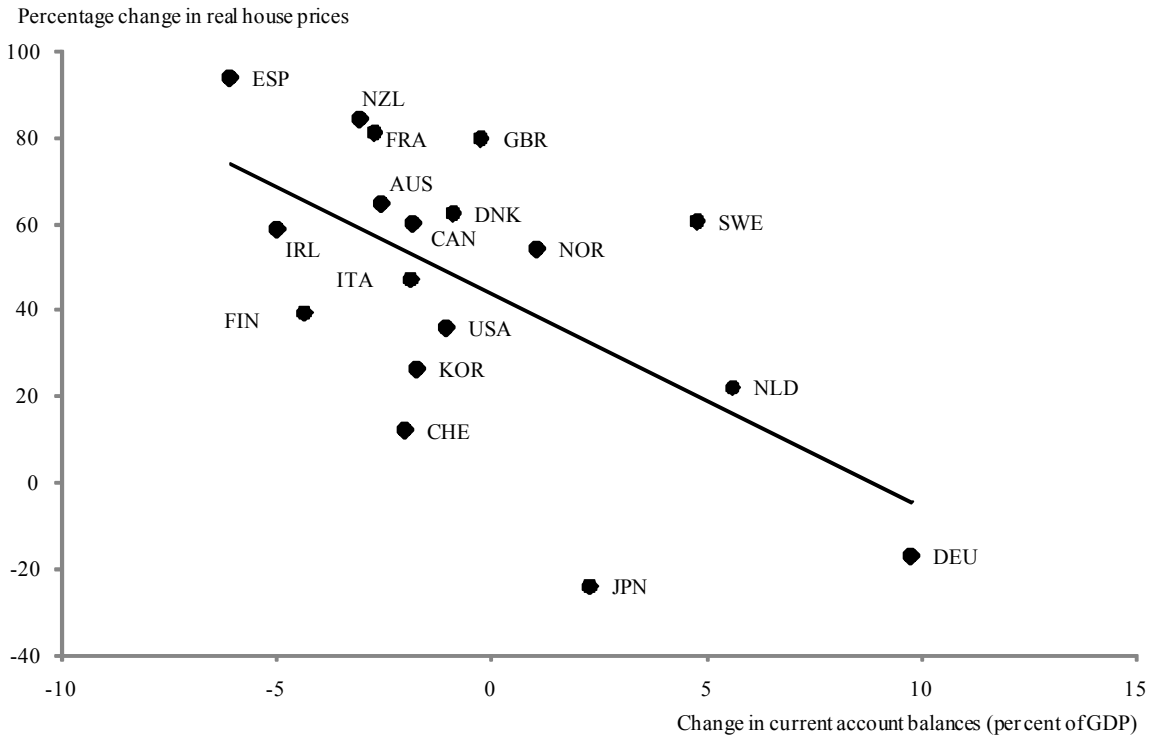
74. Third, exchange rates should react to large current account imbalances. But emerging markets successfully intervened to prevent the appreciation of their currencies. Current account imbalances would be justified if they resulted from an optimal allocation of global savings to the most profitable investment opportunities. In theory, competitive markets should allow capital to flow to the places where it is most productive. But market imperfections are created by a large array of factors, including transactions costs, imperfect information, restrictions to trade and capital flows and government interventions in currency markets. Moreover, financial investment decisions depend on expectations of returns which are by nature uncertain and often volatile. In the presence of high uncertainty, investors often tend to display a herd behaviour, which can lead to a misallocation of capital and asset price booms. Historically, large capital inflows have often resulted in misguided investments. The recent events in the United States are only the latest illustration. The Asian crisis of 1997 was preceded by large capital inflows into dynamic Asian economies and massive speculation on Asian assets. In the 1970s, the recycling of petrodollars into loans to South America has ended in a deep debt crisis and a "lost decade" for the continent. While, in each case, irresponsible lending was involved, the lesson seems to be that large capital inflows are difficult to recycle in an efficient way.

75. This observation implies that policymakers should pay more attention to internal and external imbalances. In a system where natural stabilising mechanisms are weakened, imbalances build up slowly and widen with the increase in confidence during the ascending phase of the cycle. The adjustment eventually takes place in an abrupt way. White (2009) notes that in the Nordic countries, Japan and South East Asian countries, "the crisis emerged suddenly and unexpectedly, and without any significant degree of accelerating inflation beforehand". It has also been the case in the latest crisis that started in the United States. The subprime breakdown has been the catalyst of the crisis. Better regulation and supervision would have prevented the subprime market collapse. But given the widespread mispricing of risks, it is likely that another event would have triggered an adjustment that imbalances had made unavoidable.[65]

64. Core inflation refers to the change in the consumer price index excluding food and energy.

65. A few years ago, many observers thought that a collapse in the value of the dollar, as a result of a loss of confidence in dollar denominated assets could have been such an event (*e.g* Obstfeld and Rogoff, 2009).

Figure 12. Evolution of real house prices and current account balances
2000-2007



Source: National sources and OECD Economic Outlook 86 database.

76. A number of authors have proposed instruments for monitoring the development of internal and/or external imbalances: Arestis and Karakitsos (2010) have proposed that central banks set a target for the net wealth of the personal sector as a per cent of disposable income; White (2009) has recommended building a "new macrofinancial stability framework" to reduce pro-cyclicality, in which a set of indicators of imbalances that do seem to have predictive power – *e.g.* unusually rapid credit and monetary growth, high asset prices, low saving rates – would be monitored. Many countries, including the United Kingdom and the United States, as well as the European Commission, seem to be moving in the direction of a macroprudential framework. Other authors have proposed early warning indicators of costly asset price booms (IMF, 2009b; Alessi and Detken, 2009; Agnello and Schuknecht, 2009). Finally, in a globalised world, international cooperation is essential to ensure the stability of the world economy. Exchange rate arrangements and the asymmetry of adjustment pressures between countries with current account surpluses and deficits specially call for international coordination.[66]

5. Conclusions

77. The housing market expansion that had started in the mid-1990s and has developed into a boom in many countries has ended abruptly with the collapse of the US subprime mortgage market in 2007. During the first phase of the upturn – approximately until 2003-04 – improvements in financing conditions, as well as other fundamental factors, seem to have been the main driving force behind house price appreciation in most OECD countries. In subsequent years, many housing markets seem to have overshot,

66. Obstfeld and Rogoff (2009) argue that "in the interest of global stability, the policy choices of sovereign nations, including their exchange rate arrangements, must be viewed as legitimate subjects for international discussion and negotiation".

as expectations of future capital gains on houses became entrenched. These events call for a reappraisal of housing-related policies. Countries with a tax system encouraging homeownership should progressively move to more neutral settings. Monetary policy probably has a limited ability to deal with asset price booms. However, it should be paying more attention than in the recent past to the build-up of financial and economic imbalances. Fiscal policy could also play a greater role in moderating aggregate demand during booms. Regulation and supervision of the financial system has been clearly deficient in many countries. Designing the appropriate regulatory framework in a globalised world, were financial innovation is prevalent, is challenging and will require effective international cooperation. However, it is a prerequisite for well functioning financial markets, housing finance and housing markets.

REFERENCES

Adrian, T. and H.S. Shin (2008), "Liquidity, Monetary Policy, and Financial Cycles", *Current Issues in Economics and Finance*, Vol. 14, No 1., January-February, Federal Reserve Bank of New York.

Agnello, L. and L. Schuknecht (2009), "Booms and Busts in Housing Markets. Determinants and Implications", *European Central Bank Working Paper*, No 1071.

Ahearne, A. G., J. Ammer, B. M. Doyle, L. S. Kole and R. F. Martin (2005), "Monetary Policy and House Prices: A Cross-country Study", *International Finance Discussion Paper*, No. 841, Board of Governors of the Federal Reserve System (US).

Ahrend, R., B. Cournède and R. Price (2008), "Monetary Policy, Market Excesses and Financial Turmoil", *OECD Economics Department Working Paper*s, No. 597, OECD, Paris.

Alessi, L. and C. Detken (2009), "'Real time' Early Warning Indicators for Costly Asset Price Boom/bust Cycles. A Role for Global Liquidity", *European Central Bank Working Paper*, No. 1039.

André, C. and N. Girouard (2010), "Housing Markets, Business Cycles and Economic Policies", in Arestis, P., P. Mooslechner and K. Wagner (eds.), *Housing Market Challenges in Europe and the United States*, Palgrave Macmillan.

Aoki, K., J. Proudman and G. Vlieghe (2002), "Houses as Collateral: Has the Link between House Prices and Consumption in the UK Changed ?", Federal Reserve Bank of New York, *Economic Policy Review*, Vol. 8, No. 1, New York.

Arestis, P. and E. Karakitsos (2010), "Subprime Mortgage Market and Current Financial Crisis" in Arestis, P., P. Mooslechner and K. Wagner (eds.), *Housing Market Challenges in Europe and the United States*, Palgrave Macmillan.

Ayuso, J. and F. Restoy (2006), "House Prices and Rents in Spain: Does the Discount Factor Matter?", *Documentos de Trabajo*, No. 0609, Banco de España.

Barker, K. (2006), *Barker Review of Land Use Planning. Interim Report* – Analysis, London.

Berger, T., P. Englund, P. H. Hendershott and B. Turner (2000), "The Capitalization of Interest Subsidies: Evidence from Sweden", *Journal of Money, Credit and Banking*, Vol. 32, No. 2, May, pp. 199-217.

Bernanke, B., M. Gertler, S. Gilchrist (1998), "The Financial Accelerator in a Quantitative Business Cycle Framework", *NBER Working Paper*, No. 6455.

BIS (2006), "Housing Finance in the Global Financial Market", *CGFS papers*, No. 26, Bank for International Settlements, January.

Blundell-Wignall, A., P. Atkinson and S. H. Lee (2008), "The Current Financial Crisis: Causes and Policy Issues", *OECD Financial Market Trends*, Vol. 2008/2, No. 95.

Bover, O. and J. F. Jimeno (2007), "House Prices and Employment Reallocation: International Evidence", *Documentos de Trabajo*, No. 0705, Banco de España.

Brender, A. and F. Pisani (2009), "Globalised Finance and its Collapse", Dexia, Belgium.

Brixiova, Z., L. Vartia and A. Wörgötter (2009), "Capital Inflows, Household Debt and the Boom Bust Cycle in Estonia", *OECD Economics Department Working Papers*, No. 700, OECD, Paris.

Brounen, D. and P Neuteboom (2008), "De Effectiviteit van Hypotheekrenteaftrek (Effectivity of mortgage interest deductibility)", ESB (*Economic-Statistical Bulletin*), pp. 120-121.

BSA (2007), "House Price Expectations: an Insight into How People Think about Property Purchase", Building Societies Association, London.

Calza, A., T. Monacelli and L. Stracca (2009), "Housing Finance and Monetary Policy", *European Central Bank Working Paper,* No. 1069.

Capozza, D. R. and R. W. Helsley (1989), "The Fundamentals of Land Prices and Urban Growth", *Journal of Urban Economics* 26, pp. 295-306.

Catte, P., N. Girouard, R. Price and C. André (2004), "Housing Markets, Wealth and the Business Cycle", *OECD Economics Department Working Paper*s, No. 394, OECD, Paris.

CBO (2007), "Housing Wealth and Consumer Spending", United States Congressional Budget Office, January.

Cecchetti, S. (2006), "Measuring the Macroeconomic Risks Posed By Asset Price Booms", *NBER Working Paper*, No. 12542.

Cho, M. (1996), "House Price Dynamics: a Survey of Theoretical and Empirical Issues", *Journal of Housing Research*, Vol. 7, Issue 2.

Commission Bancaire (2009), Synthèse de l'enquête du Secrétariat général de la Commission bancaire sur le financement de l'habitat en 2008, July.

De Bandt, O., K. Barhoumi and C. Bruneau (2009), "The International Transmission of House Price Shocks", Conference on the "Macroeconomics of Housing Markets", Banque de France, Paris 3—4 December 2009.

De Michelis, A. (2009), "Overcoming the Financial Crisis in the United States", *OECD Economics Department Working Papers*, No. 669, OECD, Paris.

Detken, C. and F. Smets (2004), "Asset Price Booms and Monetary Policy", *European Central Bank Working Paper,* No. 364.

Durning, D. and J. Quigley (1985), "On the Distributional Implications of Mortgage Revenue Bonds and Creative Finance", *National Tax Journal* 38, December, pp. 513-23.

ECB (2005), "Asset Price Bubbles and Monetary Policy", *European Central Bank Monthly Bulletin*, April.

ECB (2009), "Housing Finance in the Euro Area", *Structural Issues Report*, European Central Bank.

EMF (2006), *Study on the Cost of Housing in Europe*, European Mortgage Federation, Brussels.

Engelhardt, G.V. (1996), "Consumption, Down Payments, and Liquidity Constraints," *Journal of Money, Credit and Banking*, 28, pp. 255-271.

Erlandsen, E., J. Lundsgaard and F. Huefner (2006), "The Danish Housing Market: Less Subsidy and More Flexibility", *OECD Economics Department Working Paper*s, No.513, OECD, Paris.

Ferrara, L. and S. J. Koopman (2009), "Common Business and Housing Market Cycles in the Euro Area from a Multivariate Decomposition", Conference on the "Macroeconomics of Housing Markets", Banque de France, 3-4 December 2009, Paris.

Foncier Expertise (2006), "Le Marché résidentiel et les Non-Résidents", Direction des Études et Expertises Immobilières CFF, September.

FSB (2009), "Improving Financial Regulation", *Report of the Financial Stability Board to G20 Leaders*, 25 September 2009.

Geithner, T. (2008), "Remarks at The Economic Club of New York, New York City", 9 June.

Gete, P. (2008), "Housing Markets and Current Account Dynamics", *University of Chicago Job Market Paper*.

Girouard, N., M. Kennedy, P. Van den Noord and C. André (2006a), "Recent House Price Developments: the Role of Fundamentals", *OECD Economics Department Working Papers*, No. 475, OECD, Paris.

Girouard, N., M. Kennedy and C. André (2006b), "Has the Rise in Debt Made Households More Vulnerable?", *OECD Economics Department Working Papers,* No. 535, OECD, Paris.

Glaeser, E. L., J. Gyourko and R. E. Saks (2005), "Why Have Housing Prices Gone Up?", *NBER Working Paper*, No. 11129.

Glaeser, E. L. and J. Gyourko (2007), "Arbitrage in Housing Markets", *NBER Working Paper*, No. 13704.

Glaeser, E. L., J. Gyourko and A. Saiz (2008), "Housing Supply and Housing Bubbles", *Journal of Urban Economics* 64, pp. 198–217.

Gordon, R. J. (2005), "What Caused the Decline in US Business Cycle Volatility?", *CEPR Discussion Paper*, No. 5413.

Green, R. K., S. Malpezzi and S. K. Mayo (2005), "Metropolitan-Specific Estimates of the Price Elasticity of Supply of Housing, and Their Sources", *American Economic Review, American Economic Association*, Vol. 95(2), pp. 334-339, May.

Green, R. K. and S. M. Wachter (2007), "The Housing Finance Revolution", paper presented at the Housing, Housing Finance, and Monetary Policy Symposium, sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, WY, 30 August – 1 September.

Greenspan, A. (2009), "The Fed Didn't Cause the Housing Bubble", *The Wall Street Journal*, 12 March.

Gstach, D. (2007), "The Housing Rental Rate Elasticity of Aggregate Consumption: A Panel Study for OECD Countries", *European Journal of Housing Policy*, Vol. 7, No. 4, pp. 367–382, December.

Gstach, D. (2010), "The Rental Housing Market", in Arestis, P., P. Mooslechner and K. Wagner (eds.), *Housing Market Challenges in Europe and the United States,* Palgrave Macmillan.

Gurkaynak, R. (2005), "Econometric Tests of Asset Price Bubbles: Taking Stock", *Finance and Economics Discussion Series*, No. 2005-04, Board of Governors of the Federal Reserve System.

Gyourko, J. (2009), "The Supply Side of Housing Markets", *NBER Reporter: Research Summary 2009*, No. 2.

Heyer, E., S. Le Bayon, H. Péléraux and X. Timbeau (2005), "L'immobilier, pilier de la croissance ou épée de damoclès", *Document de travail de l'OFCE*, No. 2005-16, October.

Hiebert, P. and M. Sydow (2009), "What Drives Returns to Euro Area Housing? Evidence from a Dynamic Dividend-discount Model", *European Central Bank Working Paper*, No. 1019.

Hilbers, P., A.W. Hoffmaister, A. Banerji and H. Shi (2008), "House Price Developments in Europe: a Comparison", *IMF Working Paper*, WP/08/211.

Hoeller, P. and D. Rae (2007),"Housing Markets and Adjustments in Monetary Union", *OECD Economics Department Working Papers*, No. 550, OECD, Paris.

IMF (2003), "When Bubbles Burst", *International Monetary Fund World Economic Outlook*, April, Chapter 2.

IMF (2008), "The Changing Housing Cycle and the Implications for Monetary Policy", *International Monetary Fund World Economic Outlook*, April, Chapter 3.

IMF (2009a), "Global Prospects and Policies", *International Monetary Fund World Economic Outlook*, October, Chapter 1.

IMF (2009b), "Lessons for Monetary Policy from Asset Price Fluctuations", *International Monetary Fund World Economic Outlook*, October, Chapter 3.

Jagannathan, R., M. Kapoor and E. Schaumburg (2009), "Why Are We in a Recession? The Financial Crisis is the Symptom, not the Disease", *NBER Working Paper*, No. 15404.

Johansson, A., C. Heady, J. Arnold, B. Brys and L. Vartia (2008), "Tax and Economic Growth", *OECD Economics Department Working Papers*, No. 620, OECD, Paris.

Kennedy, M. and T. Sløk (2005), "Explaining Risk Premia on Bonds and Equities", *OECD Economic Studies,* No. 40, 2005/1, OECD, Paris.

King, M. (2009), Speech by Mervyn King, Governor of the Bank of England, to Scottish business organisations, Edinburgh, 20 October 2009.

Kranendonk, H. and J. Verbruggen (2008), "Are Houses Overvalued in the Netherlands?", *CPB Memorandum*, 22 April 2008.

Lunde, J., K. Scanlon and C. Whitehead (2008), "Interest-only and Longer-term Mortgages: Easier Access, More Risk" in: *Hypostat 2007*, European Mortgage Federation, November.

Meen, G. (2002), "The Time-Series Behavior of House Prices: A Transatlantic Divide?", *Journal of Housing Economics* 11, 1–23.

Meen, G. (2008), "A Simple Model of Housing and the Credit Crunch", University of Reading.

Miles, D. and V. Pillonca (2008), "Financial Innovation and European Housing and Mortgage Markets", *Oxford Review of Economic Policy*, Vol. 24, No. 1, 2008, pp.145–175.

Minsky, H. P. (1992), "The Financial Instability Hypothesis.", *The Jerome Levy Economics Institute of Bard College,Working Paper,* No. 74.

Mishkin, F. S. (2008), "How Should we Respond to Asset Price Bubbles?", speech at the Wharton Financial Institutions Center and Oliver Wyman Institute's Annual Financial Risk Roundtable, Philadelphia, Pennsylvania, 15 May 2008.

Moëc, G. (2007), "Thinking About Buying a House in Europe?", Bank of America, *European Economics*, *Economic Brief*, 1 February.

Muellbauer, J. (2006), "Housing and Personal Wealth in a Global Context", paper prepared for the *United Nations-WIDER Project Meeting,* "Personal Assets from a Global Perspective", Helsinki, Finland, 4-6 May.

Muellbauer, J. and A. Murphy (2008), "Housing Markets and the Economy: the Assessment", *Oxford Review of Economic Policy*, Vol. 24, No. 1, 2008, pp.1–33.

Norges Bank (2009), "Financial Stability 1/2009".

Obstfeld, M. and K. Rogoff (2009), "Global Imbalances and the Financial Crisis: Products of Common Causes", Federal Reserve Bank of San Francisco Asia Economic Policy Conference, Santa Barbara, CA, 18-20 October 2009.

OECD (2006), *OECD Economic Surveys: Ireland*, OECD, Paris.

Pareja-Eastaway, M. and T. Sánchez-Martínez (2010), "European Rental Markets: Regulation or Liberalization ? The Spanish Case", in Arestis, P., P. Mooslechner and K. Wagner (eds.), *Housing Market Challenges in Europe and the United States*, Palgrave Macmillan.

Piazzesi, M. and M. Schneider (2009), "Momentum Traders in the Housing Market: Survey Evidence and a Search Model", *NBER Working Paper*, No. 14669.

Poterba, J.M. (1984), "Tax Subsidies to Owner-occupied Housing: An Asset-market Approach", *The Quarterly Journal of Economics*, 99:4, pp. 729-752.

Priemus, H. and D. Maclennan (1998), "The Different Faces of Private Rented Housing", *Netherlands Journal of Housing and the Built Environment*, Vol. 13, No. 3.

RBA (2009), *Financial Stability Review*, Reserve Bank of Australia, September.

Rubio de Juan, M.A. (2006), "Flujos de inversión de no residentes en inmuebles residenciales - Flujos de inversión de residentes en inmuebles residenciales fuera de España", Ministerio de Vivienda.

Scanlon, K. and C. Whitehead (2004), "International Trends in Housing Tenure and Mortgage Finance", Council of Mortgage Lenders, November.

Schnure, C. (2005), "Boom-Bust Cycles in Housing: The Changing Role of Financial Structure", *International Monetary Fund Working Paper*, No. 05/200.

Shiller, R. J. (2007), "Understanding Recent Trends in House Prices and Home Ownership", *NBER Working Papers*, No. 13553.

Shiller, R. J. (2009), "In Defence of Financial Innovation", *Financial Times*, 27 September 2009.

Sierminska, E. and Y. Takhtamanova (2007), "Wealth Effects out of Financial and Housing Wealth: Cross Country and Age Group Comparisons", *Federal Reserve Bank of San Francisco Working Paper*, No. 2007-01.

Skaarup, M. and S. Bødker (2009), "House Prices in Denmark: Are They Far from Equilibrium?", *Danish Ministry of Finance Working Paper* (forthcoming).

Skudelny, F. (2009), "Euro Area Private Consumption. Is There a Role for Housing Wealth Effects?", *European Central Bank Working Paper*, No. 1057, May.

Sosvilla Rivero, S. J. (2008), "Immigration and Housing Prices in Spain", *FEDEA Working Paper*, No. 2008-40.

Trichet, J.C. (2009), "Credible Alertness Revisited", intervention by Jean-Claude Trichet, President of the ECB, at the symposium on "Financial Stability and Macroeconomic Policy" sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 22 August 2009.

Van den Noord, P. (2005), "Tax Incentives and House Prices in the Euro Area: Theory and Evidence", *Economie Internationale*, No. 101.

Vansteenkiste, I. (2007), "Regional Housing Market Spillovers in the US: Lessons from Regional Divergences in a Common Monetary Policy Setting", *European Central Bank Working Paper*, No. 708.

Vansteenkiste, I. and P. Hiebert (2009), "Do House Price Developments Spill Over Across Euro Area Countries? Evidence from a Global VAR", *European Central Bank Working Paper*, No. 1026.

White, W.R. (2009), "Should Monetary Policy 'Lean or Clean'?", Federal Reserve Bank of Dallas, *Globalization and Monetary Policy Institute Working Paper*, No. 34.

Whitehead, C. and K. Scanlon (eds.) (2007), "Social Housing in Europe", LSE, London.

Wolswijk, G. (2010), "Fiscal Aspects of Housing in Europe", in Arestis, P., P. Mooslechner and K. Wagner (eds.), *Housing Market Challenges in Europe and the United States*, Palgrave Macmillan.

Yellen, J.L. (2009), "A Minsky Meltdown: Lessons for Central Bankers", *Federal Reserve Bank of San Francisco Economic Letter*, No. 2009-15, 1 May 2009.

ANNEX

Table A.1. Sources of house prices

Country	House price definition	Seasonal adjustment	Source and first observation
United States	Nationwide single family house price index	No	FHFA, 1975Q1
Japan	Nationwide urban land price index	No	Japan Real Estate Institute, 1990S1
Germany	Index for total Germany, total resales	--	Bundesbank, 1994
France	Indice de prix des logements anciens, France	No	INSEE, 1996Q1
Italy	Media 13 area urbane numeri indice dei prezzi medi di abitazioni, usate	No	Nomisma, 1991S1
United Kingdom	Mix-adjusted house price index	No	CLG, 1968Q2
Canada	Multiple listing series, average price in Canadian dollars	Yes	Ministry of Finance, 1980Q1
Australia	Index of a weighted average of 8 capital cities	No	Australian Bureau of Statistics, 1986Q2
Denmark	Index of one-family house sold	No	Statistics Denmark, 1971Q1
Spain	Precio medio del m^2 de la vivienda, mas de dos años de antiguedad	No	Banco de España, 1987Q1
Finland	Housing prices in metropolitan area, debt free, price per m^2	No	Bank of Finland, 2000Q1
Ireland	Second hand houses	Yes	Irish Department of the Environment 1980Q1
Korea	Nationwide house price index	No	Kookmin Bank, January 86
Netherlands	Existing dwellings	No	Nederlandsche Bank, January 76
Norway	Nationwide index for dwellings	Yes	Statistics Norway, 1992Q1
New Zealand	Quotable value index for dwellings (new and existing)	No	Reserve Bank of New Zealand, 1979Q4
Sweden	One and two dwelling buildings	No	Statistics Sweden, 1986Q1
Switzerland	Single-family home	No	Swiss National Bank, 1970Q1

Note: Quarterly and/or annual data provided by the Bank for International Settlements (based on national sources) have been used for the countries in which the sample period starts after 1970Q1.

Table A.2. Real cost of construction

Residential investment deflator adjusted for consumer price inflation

Percentage change

	1995-2000	2000-2007	1995-2007	Memo item: Change in real house prices 1995-2007
United States	3.2	15.3	19.0	50.5
Japan	-2.5	6.2	3.5	-33.7
Germany	-5.9	-1.4	-7.2	-23.5
France	-0.4	16.1	15.7	100.5
Italy	0.2	7.1	7.3	40.4
United Kingdom	11.8	48.9	66.4	165.8
Canada	-1.0	23.1	21.8	59.9
Australia	5.2	14.9	20.8	95.5
Denmark	-0.2	7.4	7.2	124.7
Finland	13.1	9.5	23.8	96.2
Ireland	57.2	44.1	126.6	256.9
Korea	-2.5	16.5	13.6	-1.6
Netherlands	12.3	11.4	25.1	109.9
New Zealand	2.7	23.5	26.9	100.4
Norway	5.4	23.5	30.2	141.6
Spain	10.8	31.5	45.7	120.1
Sweden	23.5	17.0	44.5	117.5
Switzerland	-3.9	4.9	0.8	-1.5
Average (unweigted)	7.2	17.7	27.3	84.4

Source: OECD Economic Outlook 86 database.

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