

Box 1.2. House Prices: Corrections and Consequences

Housing prices have begun falling this year in several advanced economies, a sharp contrast from the increase in prices seen during 2007 in almost all countries except the United States, where a housing correction has been under way since 2006. In real terms, and on a seasonally adjusted basis, house prices fell in the first half of 2008 at an annual rate of 5 percent to 12 percent in Canada, Denmark, Spain, New Zealand, and the United Kingdom (first figure).¹ How much more are house prices likely to come down? And what are the consequences of the declines in house prices for the macroeconomy?

Corrections in house prices. As a basis for assessing the potential for house price declines, a first step is to try to account for the increase in house prices that has taken place over the past decade in terms of important driving forces. To this end, real house price growth is modeled as a function of the following variables: growth in per capita disposable income, working-age population, credit and equity prices, and the level of short-term and long-term interest rates. The dynamic effects of these variables are captured through the inclusion of lagged real house price growth and an affordability ratio (the lagged ratio of house prices to disposable incomes). This model is estimated for each country using quarterly data for the time period 1970 to 2007.²

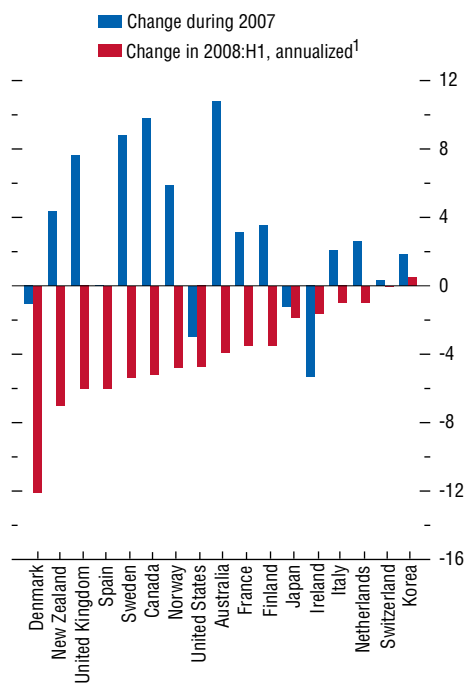
The increase in house prices not explained by these fundamental factors—referred to as

The main author of this box is Prakash Loungani. Ercument Tulun and Jair Rodriguez provided research assistance. This box updates analysis presented in the October 2007 and April 2008 issues of the *World Economic Outlook*.

¹These data are provided by the Organization for Economic Cooperation and Development (OECD) and are based on commonly used national sources, as shown here: [www.oilis.oecd.org/oilis/2006doc.nsf/linkto/ECO-WKP\(2006\)3](http://www.oilis.oecd.org/oilis/2006doc.nsf/linkto/ECO-WKP(2006)3) (p. 34). The data are seasonally adjusted by the OECD if the national authority does not provide a seasonally adjusted series. The use of seasonally adjusted data leads to some difficulty in comparability with headline figures on house prices but may be a better indication of developments in house prices over the coming months.

²The data start in 1971 for Spain and in 1986 for Korea.

Changes in Real House Prices
(Percent)



Sources: Organization for Economic Cooperation and Development; and IMF staff calculations.

¹Change in 2008:H1, annualized, for Canada, Denmark, France, Ireland, Italy, Japan, New Zealand, and United States.

the house price gap—is taken as an estimate of the potential for correction in house prices. Of course, the gap estimates could partly reflect omitted fundamental factors, such as changes in supply-side factors in the housing market.³ Nevertheless, the estimates provide an indication of how large those omitted factors would have

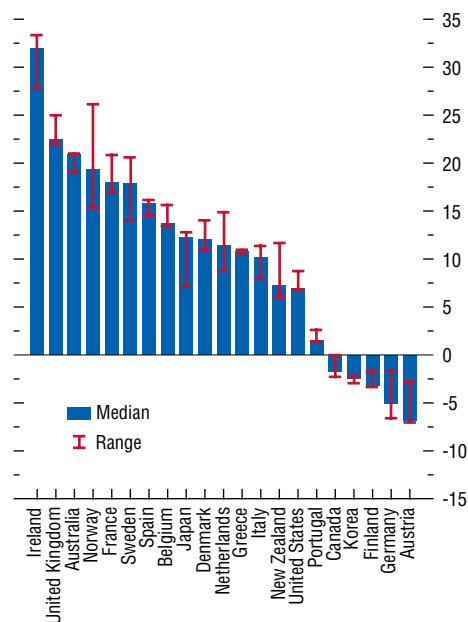
³The models estimated here focus on explaining short- to medium-run changes in house prices rather than the long-run level of house prices, which could differ considerably across countries, reflecting national supply constraints and long-term institutional factors, such as the extent of taxation of housing (Poterba, 1984). A study of European housing markets by Hilbers and others (2008) provides a good exposition of the role such factors can play in house price movements.

to be for the rise in house prices over the past years to be considered an equilibrium outcome.

The second figure shows the house price gaps—the percent increase in house prices during the period 1997 to end-2007 that is not accounted for by fundamentals. Also shown, as an indicator of the robustness of these results, is the range of gap estimates generated by small perturbations of the estimated models. These changes include using the average value of housing prices over 1994 to 1997, instead of the 1997 value, as the starting point for computing the gap estimates; estimating a parsimonious version of the model with only incomes and interest rates as the driving forces; and changing the dynamic specification by estimating a vector autoregressive model for house prices instead of a single-equation model.

The countries that have experienced the largest unexplained increases in house prices over the past decade are Australia, Ireland, and the United Kingdom;⁴ house prices in these countries were 20 percent to 30 percent higher in 2007 than can be attributed to fundamentals. A group of other countries—including France, Italy, the Netherlands, and Spain⁵—have house price gaps of between 10 percent and 20 percent.⁶ The gap estimate for the United States—

House Price Gaps
(Percent)



Source: IMF staff calculations.

about 7 percent—is smaller than for most other countries and has been narrowing compared with earlier estimates, partly reflecting the decline in U.S. house prices over the past 18 months.⁷ The range of estimates for each coun-

⁴As noted in the 2008 IMF staff report for Australia, if some country-specific factors, particularly the impact of long-term migration on housing demand, are taken into account, the results do not produce evidence of a significant overvaluation of house prices.

⁵The 2008 IMF Article IV staff report for the Netherlands notes that the estimated house price gap—estimated here as ranging from 9 to 15 percent—is likely to be much smaller if the rise in single-person households, which is very important in boosting housing demand in the Netherlands, is taken into account along with institutional factors (for example, strict zoning regulations and generous mortgage interest deductibility).

⁶Hilbers and others (2008) group European countries into “fast,” “average,” or “slow movers,” depending on the extent to which their house prices in recent years have risen above long-term averages. The gap estimates presented here turn out to be consonant with this classification: the average estimated gap for the three groups is 19 percent, 11 percent, and –3 per-

cent, respectively. Recent IMF Article IV staff reports that point to either a cooling of housing markets or the onset of a correction include reports for Canada, Korea, New Zealand, Norway, Spain, and the United Kingdom. For Germany, some studies have found higher undervaluation than the estimate of 5 percent reported here, perhaps reflecting supply-side impacts from social housing in post-reunification Germany.

⁷Klyuev (2008) estimates that single-family homes in the United States “remained 8 to 20 percent overvalued as of the first quarter of 2008.” The U.S. house price gap was estimated at about 12 percent in 2007 (Box 3.1 in April 2008 *World Economic Outlook*) and about 20 percent in 2006 (Box 2.1 in October 2007 *World Economic Outlook*).

Box 1.2 (continued)

try is about 3½ percent on average, though for the Netherlands, Norway, and Sweden the range is considerably higher.

To put these gap estimates in perspective, it is useful to compare them with house price cycles in the advanced economies over the past several decades (OECD, 2006). Between 1970 and 2005, the average house price cycle lasted about 10 years, with an expansion phase of 6 years during which real house prices increased by about 45 percent. During the subsequent four-year contraction phase, real house prices declined about 25 percent, with the range of declines across countries varying from about 10 percent in the United States to more than 30 percent in Japan and several European countries.

Thus, if house price corrections were to occur in line with the gaps shown in the second figure, they would be well within the range of previous experience. Moreover, the evidence indicates that corrections typically occur over several years. Evidence from countries with regional (that is, subnational) data suggests that for some regions, price-level corrections could be much more pronounced and last longer than the national cycle (Calomiris, Longhofer, and Miles, 2008; Estevão and Loungani, forthcoming).

Macroeconomic consequences. Experience during past housing market cycles can also be a guide to the macroeconomic consequences of these price corrections (Claessens, Kose, and Terrones, forthcoming; *World Economic Outlook*, April 2008 and April 2004). The evidence suggests, not surprisingly, that the consequences are more adverse if they occur in the context of a weakening economy and tight credit conditions, which is likely to be the situation facing many countries at present. Over the period 1960 to the present, recessions in advanced economies that are associated with house price busts and credit crunches are slightly longer and deeper than other recessions. The duration of a recession is more than one quarter longer in the case of a housing bust, total output loss during the recession is somewhat higher, and the unemployment rate increases notably more and for longer in recessions with housing busts

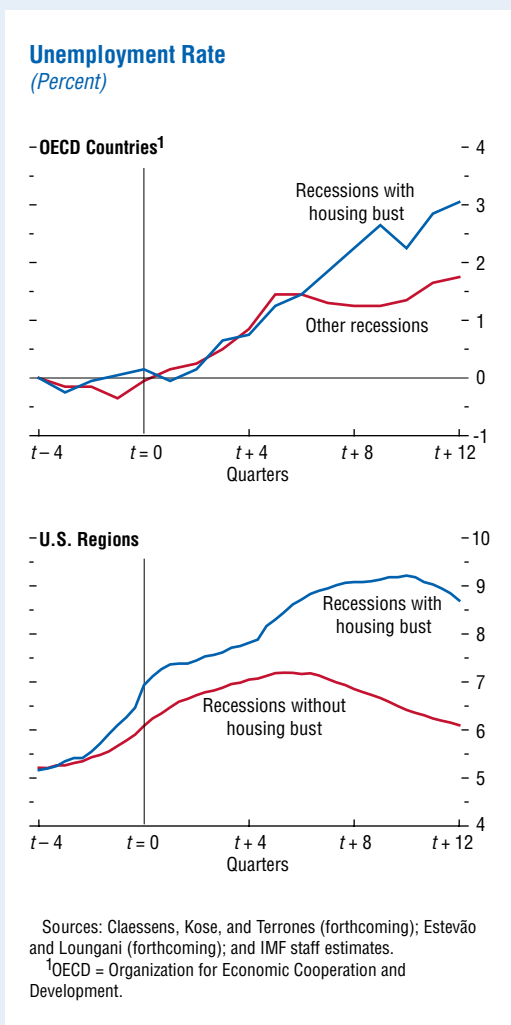
(third figure, top panel). Over the 12 quarters following the onset of a recession, the unemployment rate has increased on average by 1.5 percentage points. But in recessions associated with house price busts, the increase in unemployment is 3 percentage points.

There is some evidence that this pattern holds up at both the national and regional levels. As shown in the lower panel of the third figure, during regional recessions in the United States that are associated with a house price bust the peak impact on unemployment is an increase of 4 percentage points, compared with an increase of 2 percentage points for all regional recessions (Estevão and Loungani, forthcoming).

What about the impact of house price declines on the components of output? There is a growing literature on the possible impact of changes in housing wealth on consumption. Buiter (2008) demonstrates that changes in house prices are redistributions of wealth and hence do not have much impact on net wealth in the aggregate; however, they can affect individual consumption by relaxing collateral constraints. Consistent with this point, Muellbauer (2008) finds that with careful modeling of the effect of credit market development and deregulation, which raises access to housing collateral, changes in house prices have a medium-run liquidity effect on U.S. and U.K. consumption.

The impact on investment is more readily apparent. Claessens, Kose, and Terrones (forthcoming) find that investment—residential investment in particular—tends to fall more sharply in recessions associated with housing busts and with credit crunches than in other recessions.⁸ There are also significant cross-

⁸Benito (2007) finds, using household-level data for the United Kingdom, that it is much more common for withdrawal from home equity to flow into residential investment than consumer spending, which suggests that the collateral channel stressed by Buiter (2008) and Muellbauer (2008) could be stronger for investment than consumption.



country differences in the extent of the residential investment declines, which in principle can depend on a wide range of characteristics of national financial and legal systems. One important dimension is the ease with which households can access mortgage credit. This can be measured either by the depth of mortgage markets or by an index that summarizes the institutional features of mortgage markets. The mortgage market index incorporates features such as the typical ratio of mortgage loans to property values, the standard length of mortgage loans, the capacity to borrow against

accumulated home equity, and the degree of development of secondary markets for mortgage loans. As shown in the top two panels of the fourth figure, declines in residential investment have tended to be higher in countries where households have had more access to mortgage credit.⁹

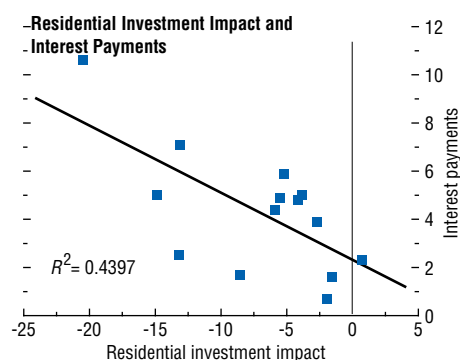
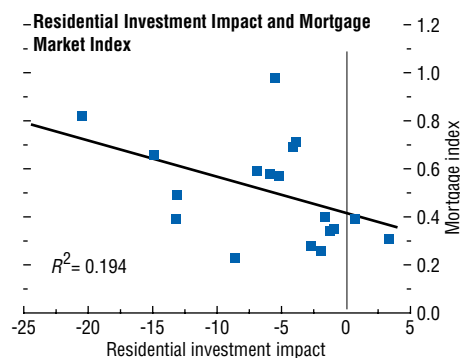
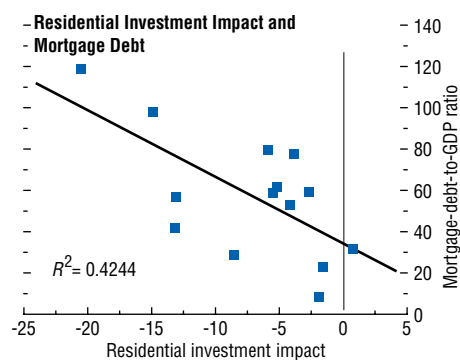
Other factors can play a role in explaining the amplitude of the economic cycle following house price corrections. In addition to the characteristics of mortgage markets already discussed, a key feature at the current juncture is the prevalence of mortgages with variable (as opposed to fixed) interest rates. There are differences within Europe in this respect, where Finland, Ireland, and Spain have mostly variable rate mortgages. Higher interest payments (relative to household disposable income) have also been historically associated with bigger declines in residential investment during housing busts—see the bottom panel in the fourth figure.¹⁰ Countries also differ in terms of legal provisions, such as those that govern

⁹Data on the depth of mortgage markets—the ratio of outstanding mortgage debt to income—are reported in Warnock and Warnock (2007) and OECD (2006). The mortgage market index is described in Chapter 3 of the April 2008 *World Economic Outlook*. The debt measure used here is the ratio of mortgage debt to household disposable income for the 1990s (from OECD, 2006), but the use of other measures of debt—for other years or expressed as a ratio to GDP—gives similar results. Controlling for the magnitude of the house price corrections makes the correlation between residential investment declines and the mortgage-debt-to-GDP ratio stronger. Cardarelli and others (forthcoming) take this analysis a step further by using sign restrictions to identify housing demand shocks and tracing the impact of these shocks on house prices, residential investment, and output. They conclude that housing finance innovation has amplified the spillovers from housing to the rest of the economy by strengthening the role of housing as collateral.

¹⁰See Tsatsaronis and Zhu (2004). Warnock and Warnock (2007) add Greece, Portugal, Sweden, and the United Kingdom to the list of European countries with mostly variable rate mortgages; outside of Europe, Canada, Japan, and the United States are classified as countries with mostly fixed rate mortgages.

Box.1.2 (concluded)

Residential Investment Impact



Sources: Claessens, Kose, and Terrones (forthcoming); OECD (2006); and IMF staff calculations.

residential mortgage lenders' recourse regarding defaulted residential mortgages, which can

influence foreclosure rates.¹¹ In many of the countries that are the focus of study in this box—France, Germany, Ireland, the Netherlands, Spain, and the United Kingdom—debtors are personally liable for the full amount of mortgaged debt, thus reducing incentives for foreclosure. In the United States, mortgage foreclosure is regulated at the state level. In six states, lenders have recourse only to the mortgaged property, which they may repossess and sell. In the other states, debtors are also personally liable for the full amount of the debt, but there are differences in the extent to which lenders can recover the difference between the mortgage debt and the foreclosure sale price. In practice, lenders may choose not to seek deficiency judgments mainly because of the time and cost involved.

Another factor that can play a role in explaining the amplitude of the economic cycle following house price corrections is banking sector exposure to the housing sector, which varies across countries as well as across lending institutions within countries. The value of mortgage loans held by banks, expressed as a multiple of their overall market capitalization, gives an indication of their ability to withstand the deterioration of their real estate loan portfolios. This indicator varies from about 4 in Denmark and Germany, less than 3 in Spain, about 1.5 in Canada, Japan, and the United Kingdom, and less than 1 in the United States.¹² Cross-country declines in residential investment during housing cycles have been higher in countries with greater banking sector exposure to mortgage lending, but the effect has not been as strong as that shown earlier with the mortgage-debt-to-

¹¹See Klyuev (2008) and Deutsche Bank (2008) for a discussion of the impact of foreclosure rates on house prices.

¹²Estimates for countries other than the United States are from Ahearne and others (2005) and are based on bank-level data on mortgage loans and market capitalization from Bloomberg L.P. and Worldscope; the U.S. estimate is based on total real estate loans by the banking sector and total banking sector market capitalization.

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GDP ratio. Nevertheless, at the current juncture, with bank balance sheets under renewed stress and bank equity prices low, the potential for an adverse impact on the real economy from banking system exposure to mortgage lending is perhaps greater than in the past.

Conclusions. Many advanced economies experienced a house price run-up in recent years that is difficult to account for fully in terms of fundamental driving forces such as income growth and interest rates. The correction in house prices appears to have now begun in most of these economies. If past is prologue, these cor-

rections could average about 25 percent and be spread out over a period of two to four years. Past evidence also suggests that cross-country differences in the impact of these corrections on the macroeconomy are likely to depend on the characteristics of the housing finance systems, particularly the ease with which households have been able to access mortgage credit in recent years. This feature is likely to be correlated with the extent of investment declines that occur during the house price corrections and could also have a dampening impact on consumption.