

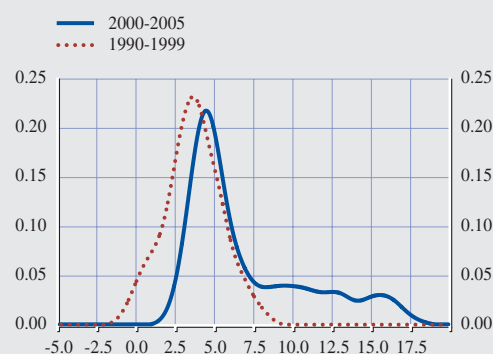
## Box 2

**POTENTIAL REGIONAL HOUSING MARKET CORRECTIONS IN THE UNITED STATES: WHAT ROLE FOR STATE-LEVEL SPILLOVERS?**

In recent years, US house prices have risen rapidly: by the end of 2005, aggregate nominal and real house prices were about 70% and 53% respectively above their early-2000 levels. These large overall changes at the national level, however, mask considerable heterogeneity in house price dynamics across cities, states and regions during this period. To a large extent, these differences can be attributed to the importance of local conditions in determining housing market conditions. For instance, from 2000 onwards property price inflation in areas with lower elasticity of land supply – such as coastal areas – was more pronounced than in other regions of the country. Reflecting this heterogeneity, the distribution of house price changes across 387 US metropolitan statistical areas has been wider since 2000 than it was during the 1990s, and considerably more positively skewed (see Chart B2.1). This geographical heterogeneity in house price changes can be contrasted with generally declining income dispersion across states over recent decades, prompting the question whether house prices, especially in some regions of the US, have become decoupled from their underlying fundamental determinants. While there is much debate as to the degree to which house prices are on aggregate misaligned with the underlying fundamentals for the US as a whole – in particular given the possibility of structural changes affecting house price relationships with the fundamentals or historical norms<sup>1</sup> – it would appear that house prices may well be overvalued in some US cities. If so, this would mean that some local markets could be vulnerable to house price correction. In this regard, this Box analyses a key issue for financial stability, namely the extent to which any prospective local housing market correction would spill over to other areas of the country. For instance, if the potential for far-reaching spillovers is high, this would mean that a generalised

<sup>1</sup> See for instance the Joint Center for Housing Studies (2006), “The State of the Nation’s Housing 2006”, which suggests that at least part of the recent surge in house prices may be due to structural changes in the relationship between house prices and the underlying fundamentals.

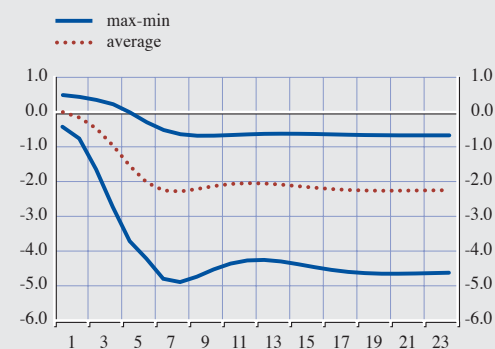
**Chart B2.1 Kernel density of average house price inflation for 387 metropolitan statistical areas in the US**



Sources: Office of Federal Housing Enterprise Oversight (OFHEO) and ECB calculations.  
 Note: The chart shows the kernel density for average house price inflation over the periods 1990-1999 and 2000-2005. The surface of each density function adds up to 1.

**Chart B2.2 Impulse response of house prices in other US states following a 10% negative shock to house prices in California**

(% difference from baseline)



Source: ECB calculations.  
 Note: The chart is based on the estimates of a GVAR model including the 31 largest US states. The average response shows the population-weighted average.

property price downturn could be triggered not only by traditional macroeconomic variables, such as income and interest rates, but also by local factors.

One way of assessing the potential that local shocks could spill over to other parts of the country is to make use of a cross-section vector auto-regression methodology<sup>2</sup> that explicitly allows for the possibility of interdependencies between state and country-wide factors. In applying this model, individual vector error-correcting models for the 31 largest US states were estimated in which the state-specific real income per capita and house prices are related to corresponding state-specific averages of these measures in the other US states weighted by distance, along with deterministic variables (such as time trends) and the real interest rate for the nation as a whole.<sup>3</sup> These individual state models are then linked together to derive generalised impulse response functions.

By way of illustrating the potential of state-level spillovers, Chart B2.2 considers the contagion effects on other states of a 10% negative shock to Californian house prices.<sup>4</sup> A population-weighted average of responses indicates that such a correction would lower house prices in the long run in the other US states by between 0.6 and 4.6%, with an average response of almost 2.5%. In this simulation, the transmission of the initial shock to other local housing markets – which more than likely reflects relatively high intra-regional labour mobility and strong

2 See S. Déés, F. Di Mauro, H. Pesaran and V. Smith (2006), “Exploring the International Linkages of the Euro Area: a Global VAR Analysis”, *Journal of Applied Econometrics*, forthcoming.

3 The real interest rate used in the model is the ten-year government bond yield deflated by the PCE deflator. The other states’ real house prices and income per capita feed into each state-specific vector error-correction model (VECM) through two variables which each represent a weighted average of all other states’ house prices and income per capita. The weights are inversely related to the distance the other states have to the state considered in the VECM. The model was estimated using quarterly data for the period Q1 1986 to Q4 2005.

4 California was chosen as an illustrative case, given that several studies have found potential overvaluation in this state. For instance, Petersen (2006) finds that California had the lowest housing affordability in 2005 in the US, whereas Himmelberg, Mayer and Sinai (2005) show that southern California was one of the two areas in the US that in the fourth quarter of 2005 appeared relatively expensive, based on imputed rent-to-income ratios (see D’Ann M. Petersen (2006), “Texas Housing: A boom with no Bubble?”, *Southwest Economy*, No. 3 May/June; and C. Himmelberg, C. Mayer and T. Sinai (2005), “Assessing High House Prices: Bubbles, Fundamentals, and Misperceptions”, *NBER Working Papers*, No. 11643).

national financial integration in the US – is relatively rapid, materialising fully within two years.

From a financial stability viewpoint, the possibility that adverse disturbances in local property markets might be propagated to other parts of the US implies that potential triggers for a more widespread housing market disturbance could extend well beyond unexpected changes in interest rates or in the state of the aggregate US business cycle. Hence, with a high degree of housing market integration, falling property prices in one region, for instance as a result of a sector-specific shock, could lead to more generalised financial sector distress via various channels. These include direct effects on mortgage borrowers and lenders, and indirect effects through contracting economic activity. While recent financial innovations, such as increased securitisation of mortgage debt, imply a mitigation of these risks for the banking sector, exposures to US housing market conditions still remain with investors in mortgage bonds, including systemically important US government-sponsored enterprises (GSEs). Such risks could also extend to the euro area financial system, both directly through exposures of financial institutions to the US housing market, and indirectly through any contagion from a weakening US macroeconomy.