WHEN IS A HOUSING MARKET OVERHEATED ENOUGH TO THREATEN STABILITY?

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1. Introduction

- Boom-bust cycles in house prices often linked with wider financial and economic crises.

- Great heterogeneity in movement of real house prices illustrated by experience of Anglo-Saxon economies, 4 credit-liberal Eurozone economies, and Germany, Italy, Japan and S. Korea.

- IMF's 2008 house price overvaluation indicators failed: some explanations suggested – omitted variables, omitted feedbacks.

- Section 2 reviews links between housing markets and financial and economic stability.

Introduction cont'd

- Section 3: econometrics of house price dynamics and the 2 kinds of overvaluation: (a) overshooting due to extrapolative expectations or 'frenzy' (b) overvaluation due to fragile fundamentals.

- Section 4 : overshooting of housing investment. Why high supply elasticity does not guarantee greater stability.

- Section 5: feedback loops via consumption: when are they important?

- Section 6: non-linear feedback loops via the financial sector. What drives bad loans?

- Section 7: conclusions. Full paper: http://ideas.repec.org/h/rba/rbaacv/acv2012-07.html

Log real house prices in the liberal Eurozone
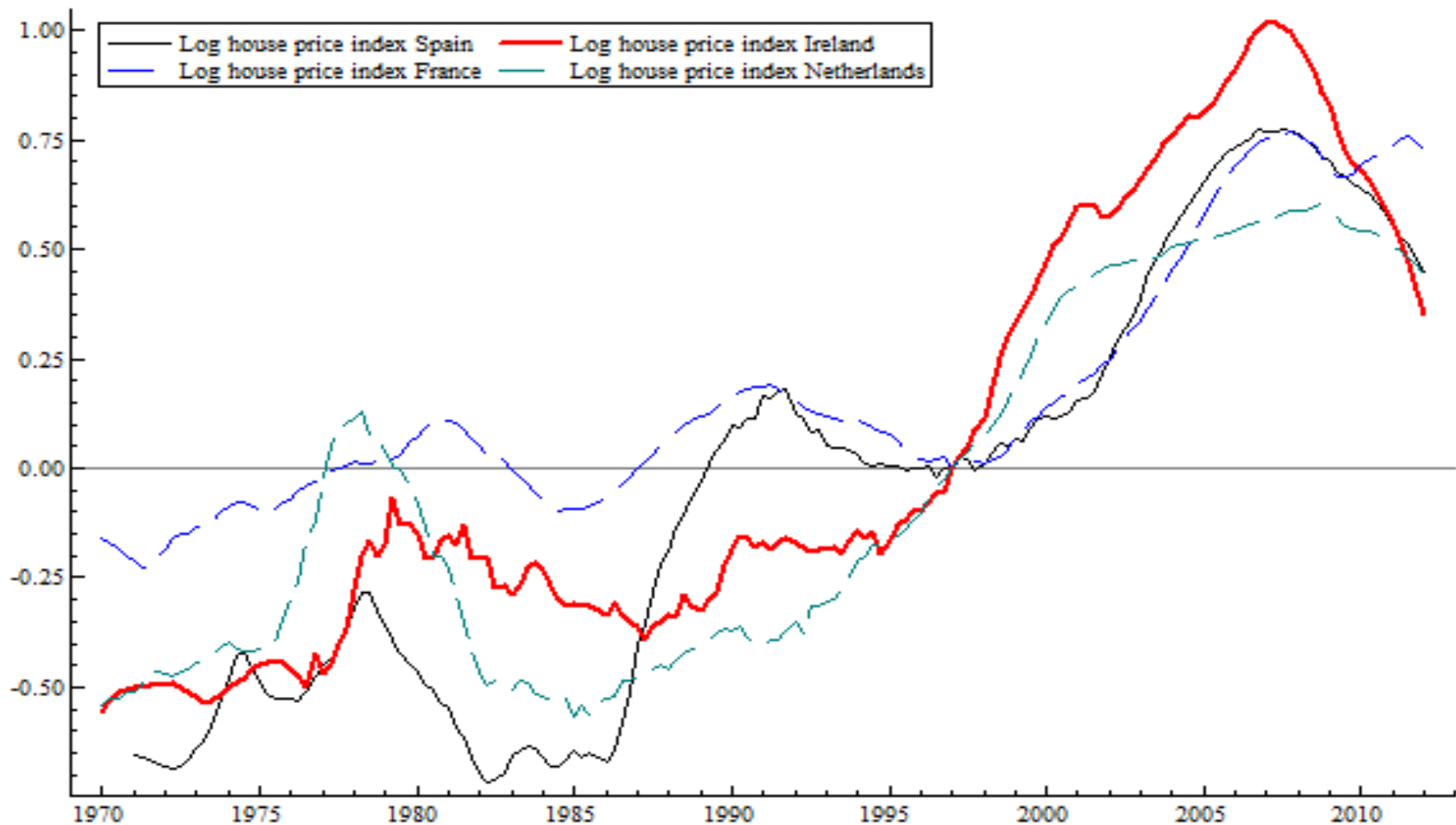
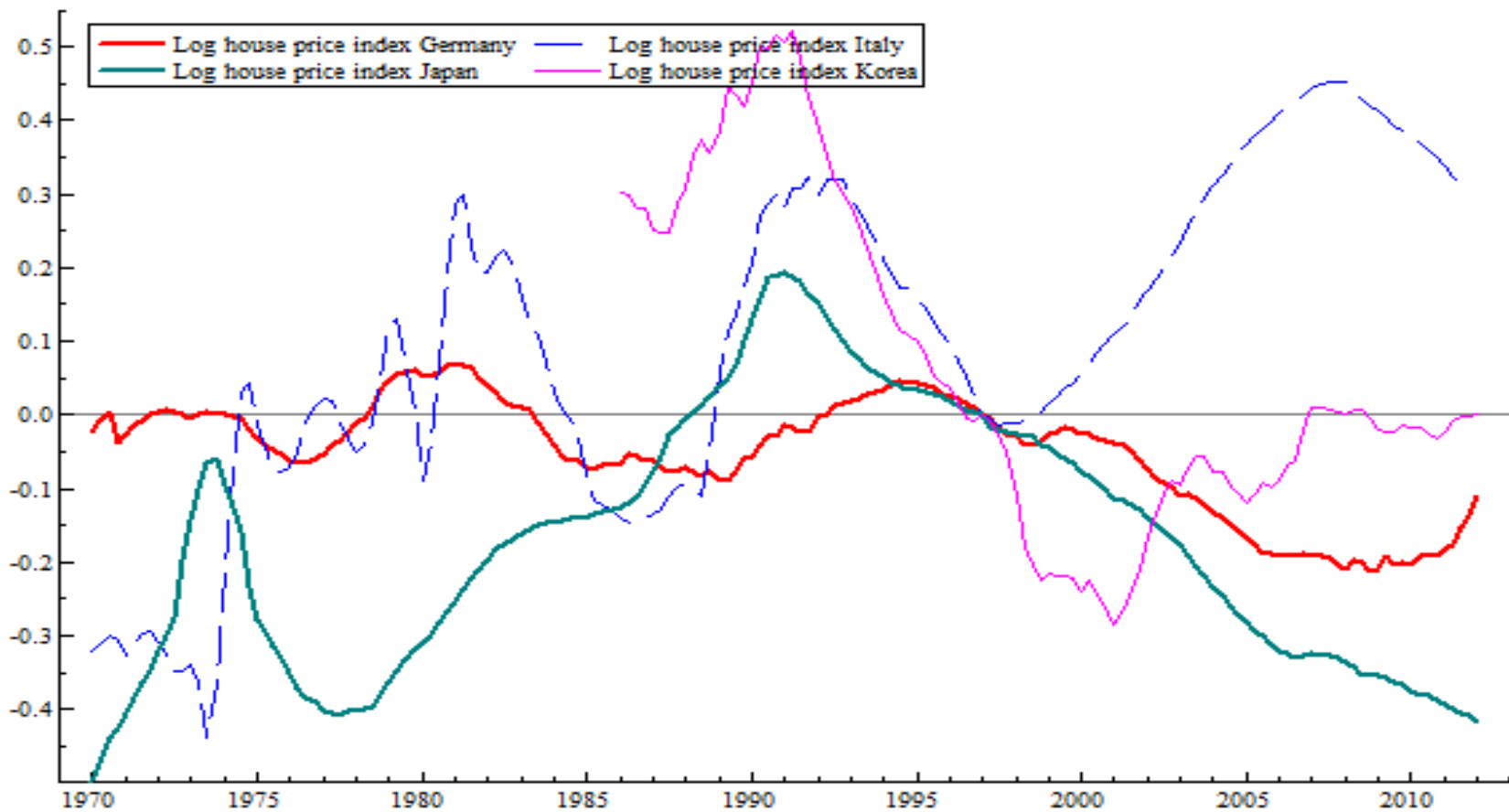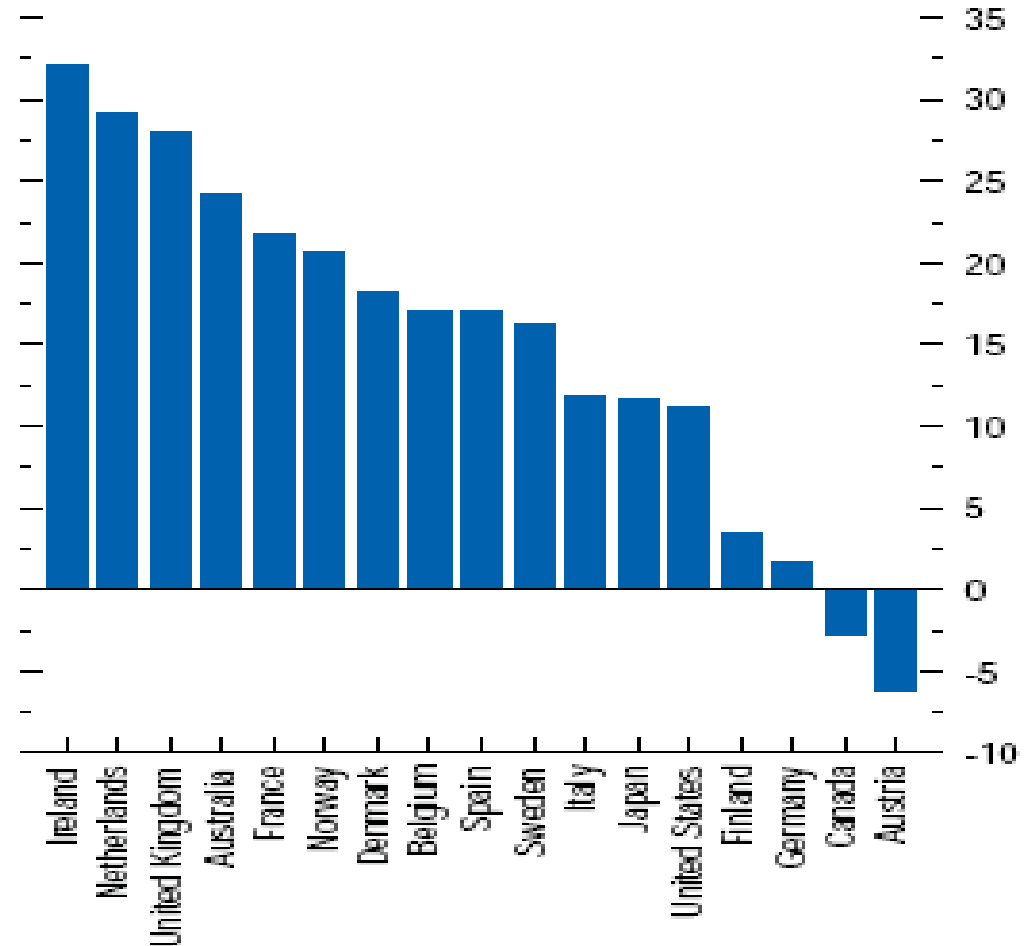# *Log real house prices in Germany, Italy, Japan and Korea*

Figure 2: IMF house price gaps estimated in early 2008.

House Price Gaps
(Percent)

Source: IMF staff calculations.

Assessing Overvaluation in House Prices', IMF (2008)

- For each country, house price growth is modelled as a function of the lagged ratio of house prices to per capita personal disposable income (PDI), growth in per capita PDI, short-term interest rates, long-term interest rates, credit growth, and changes in equity prices and working-age population.

- The unexplained increase in house prices from 1997-2007 defines the "house price gap", a measure of overvaluation.

- Only Ireland was right.

- The US, at no. 13, had *larger* falls than all 'higher risk' countries except Ireland and Spain.

- 'over-valued' Australia, France, Norway, Belgium, Sweden, and Finland had all experienced *rises* in real house prices by the third or fourth quarter of 2010 relative to the first quarter of 2008.

Why the IMF estimates were wrong

- No clear theoretical foundation.

- Omission of the supply side is a fundamental problem e.g. Ireland vs UK !

- No reason to impose long-run elasticity of 1 on income.

- Omission of permanent shifts in credit conditions (and shifts in the age-structure of the working age population).

- No distinction between temporary overshooting conditional upon fundamentals and the fragility of the fundamentals themselves.

- No account of feedback loops between the housing market and the wider economy.

2. Housing and financial stability

- US sub-prime crisis illustrates feedbacks via:

- residential construction – fell 3.5% as share of GDP.

- household consumption – decline in collateral values shrank home equity loans and refis.

- and the financial sector: bad loans restricted ability to advance credit throughout the economy, and raised credit spreads.

- Further feedbacks as lower credit availability and higher spreads lowered consumption, asset prices and house-building.

- see John Duca's graphic (from Duca and Muellbauer, 2013):

Financial accelerator via construction, consumption and credit channel: U.S. yes, but Europe??
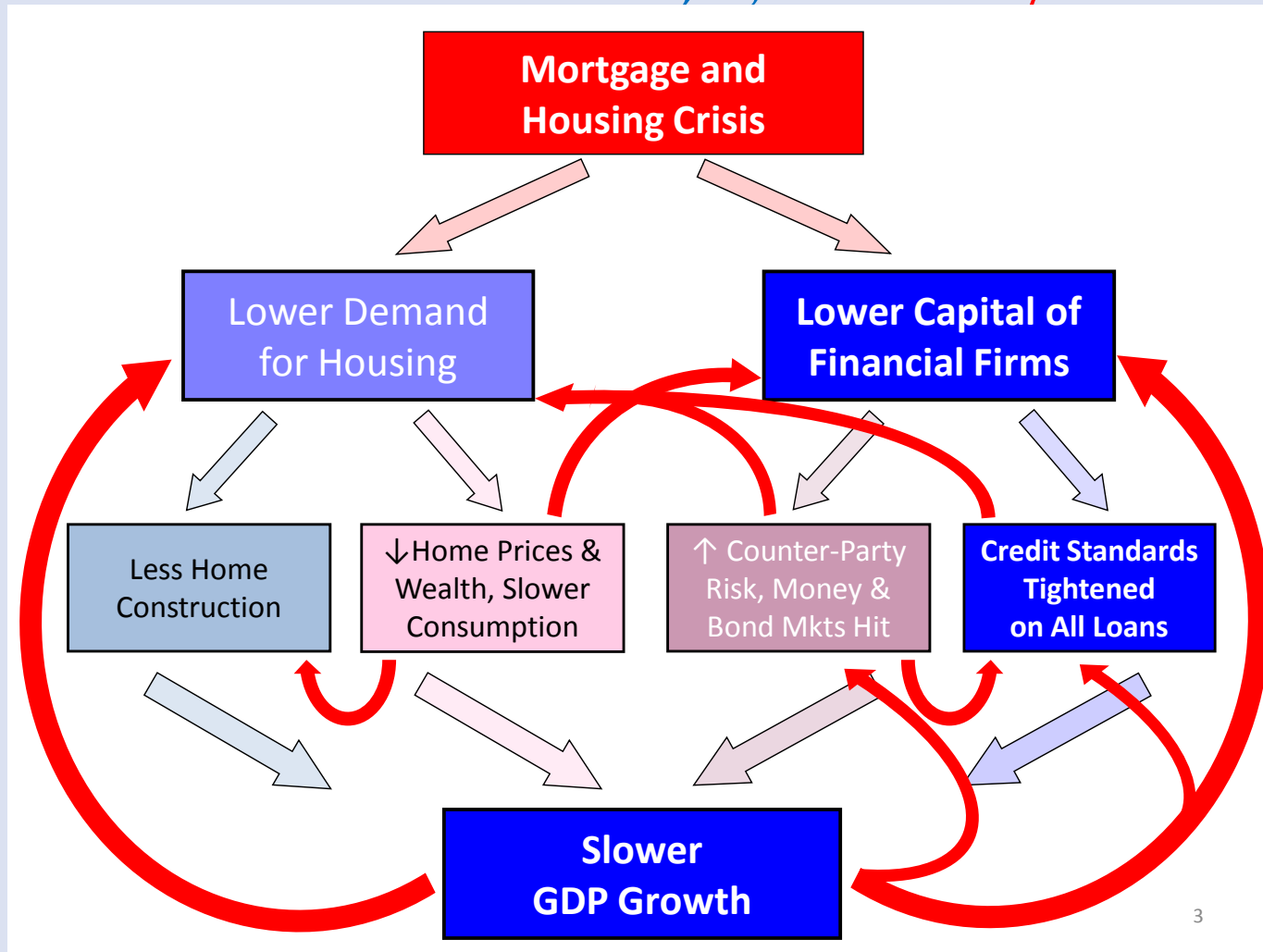
3. *What can be learned from house price models*

- Neoclassical' demand for durables theory defines 'user cost': common to both 'inverse demand' and 'rent arbitrage' approaches.

- Real user cost is *(uch)*(real house price index).

- *uch* is real after tax interest rate + (rate of property tax, transactions cost, risk premium) – expected rate of appreciation of real house prices.

- User cost concept goes back to Irving Fisher (1934), J.S. Cramer (1957), Jorgenson….. see text-book exposition in Deaton & Muellbauer (1980).

- Extrapolative expectations amplify and propagate shocks.

The 'inverse demand' approach based on supply and demand

- Demand for housing services ($\propto$ hs $\equiv$ housing stock)

$$\log hs_t = a_0 + a_1 \log y_t + a_2 \log z_t - a_3 (\log rhp_t + \log uch_t)$$

- Inverted demand => long-run house price equation

$$\log rhp_t = [a_0 + a_1 \log y_t + a_2 \log z_t - \log hs_t] / a_3$$
$$- \log uch_t$$

- Add dynamic adjustment so that part of gap between LHS and RHS is made up every quarter.

House Price-Rent Arbitrage Approach

- Arbitrage between owner and rental markets implies house price to rent ratio akin to P/E ratio for the long-run (if no credit constraints)

$$(rent / hp)_t = r_t - \dot{hp}^e_t = uch_t$$

- Inverting and taking logs:

$$\ln(hp / rent)_t = -\ln uch_t$$

- A credit constraint introduces a shadow price or 'wedge' into the basic inter-temporal efficiency condition, Meen (1990). LTV for first-time buyers is good proxy for intensity of constraint.

- The negative user cost elasticity can now be smaller than 1.

Expected appreciation is crucial part of user cost: potential for overvaluation type I

- Serious omission by central banks not to run quarterly house price expectations surveys.
- Much evidence favours link between expected appreciation and past appreciation.
- How to model? Could try limited information forecasting model but what future horizon?
- Or use lagged appreciation directly. US evidence from Duca, Muellbauer and Murphy (2011 http://ideas.repec.org/s/ecj/econjl.html, 2012) suggests 4-year memory, ditto Anudsen (Norway), UK regional evidence from Cameron, Muellbauer and Murphy (2006), and my recent work on France with Chauvin suggests mix of 1 and 4 year lagged appreciation.

Contribution to long-run log real FHFA house prices of log user cost with last four years' appreciation vs. contribution of log user cost with long-run appreciation.
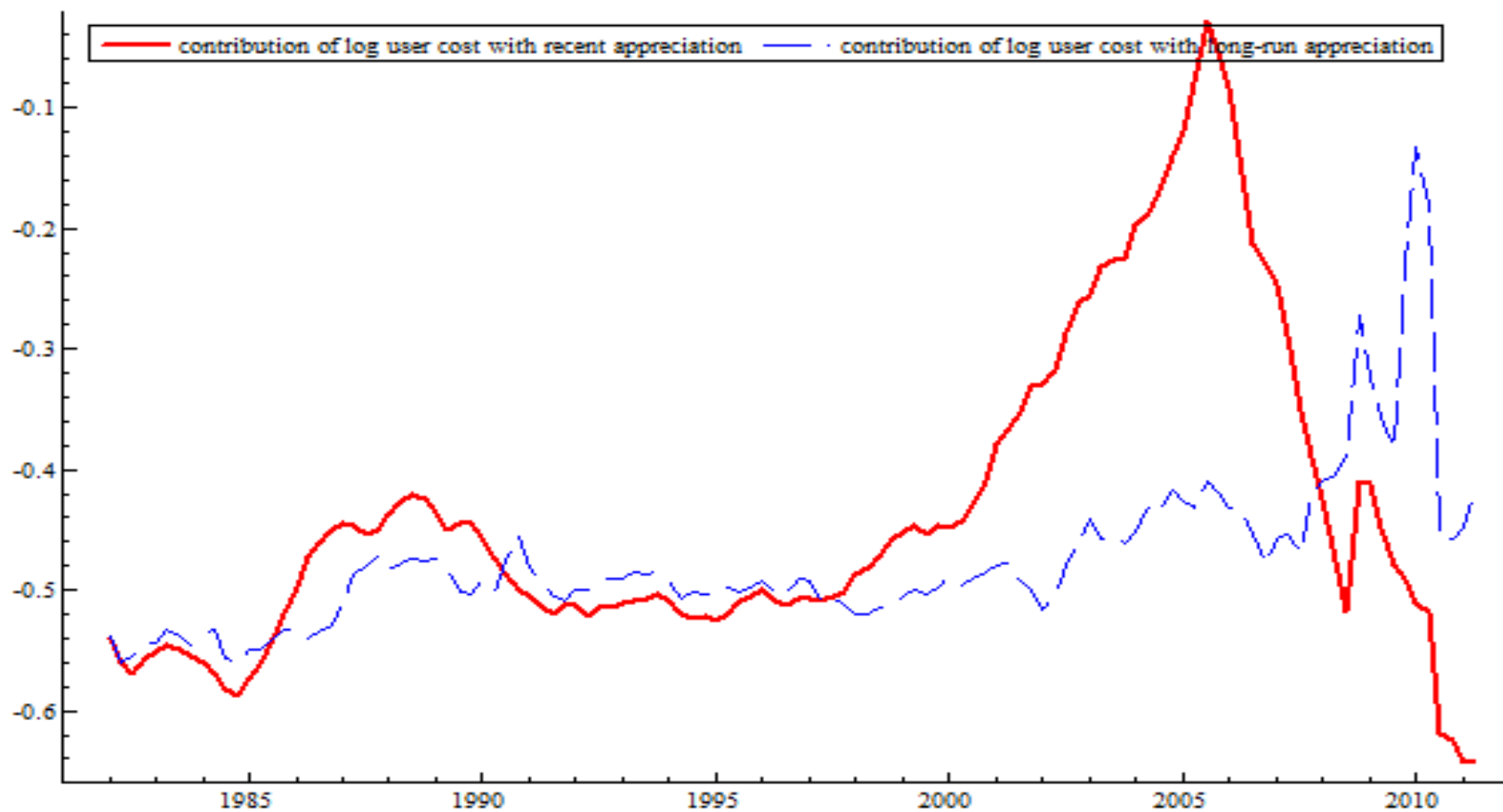
A real time prediction and can user cost be negative?

- With 4-year memory, worst of log user cost impact in US was over in 2012 - part of the reason our model correctly predicted 2012 upturn in nominal US house prices, in Dec 2009 – see longer AEA Jan. 2010 version of our 2011 EJ paper http://www.aeaweb.org/aea/conference/program/retrieve.php?pdfid=446

- Log user cost *amplifies* small fluctuations close to zero but is not defined for negative uch.

- For the same tax etc. parameters, some other US house price indices could imply negative user cost!

- Suggests introducing time varying risk premium e.g. varying with recent volatility and/or with deviation of log real house price from fundamentals.

- For France, our research suggests this works well.

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Overvaluation type II: fragile fundamentals

- Conditional house price models not enough to judge fragility of fundamentals.

- Explosion of non-prime credit in US had shaky foundations: overleveraged banking system, unsustainably weak regulation, use of derivatives to 'insure' risk, perverse incentives of 'originate and distribute' model guaranteed short 'shelf-life' etc. see Duca, M and M (2012, FMA Asian Meetings Prize, summarised in BIS Paper 64) for institutional detail.

- American Housing Survey shows that by 2009 median LTV for first-time buyers back to 1990s levels, after 2006 peak.

- Feedbacks via construction, consumption and banking system high in US-type economy – all part of fragility.

Fragile fundamentals: Spain

- Compare Spain and France: same rise in real house prices from 1997-2008. But current a/c far worse, greater decline in competitiveness, far greater construction boom, worse lending quality, and larger consumption feedback. So Spain in deep crisis.
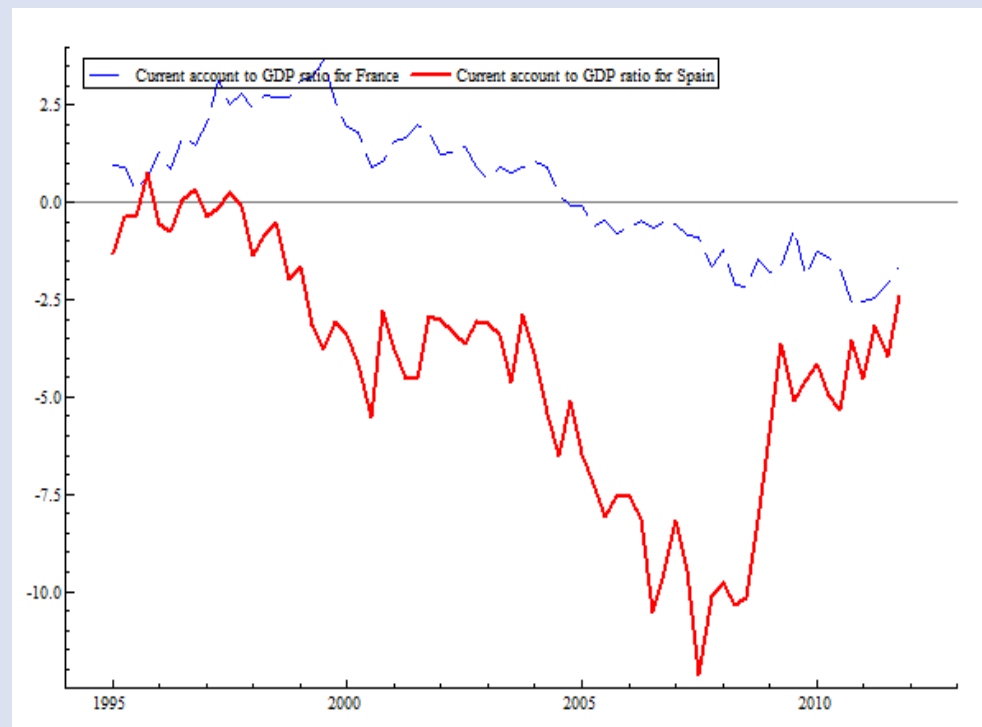

Figure 7: Contrasting current account-to-GDP ratios in France and Spain.

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Fragile fundamentals: Finland and the UK

- Early 90s Finland had both types of overvaluation after 1980s credit and house price boom. Then Soviet block imploded and main export market collapsed. GDP fell 13% and unemployment rose from 3 to almost 20%.

- Early 90s UK, after 1980s credit and house price boom:

- Anthony Murphy and I argued in 1989 (*Economic Policy* 1990) debate with Mervyn King that the current a/c was unsustainable because domestic demand fundamentals were fragile, house prices had overshot, Sterling was over-valued and UK supply-side weak.

- King's view: rise in house prices and credit in 1980s mainly due to improved household expectations of future income growth and disagreed both with our diagnosis and cure.

4. Does greater responsiveness of housing supply imply lower volatility of prices and lower risk of economic instability?

- Responsiveness to *what*: house prices or user cost?

- Empirical literature on 'supply elasticity of housing' is extraordinarily contradictory – often even within the same article.

- Di Pasquale (1999) explains some of the complexities.

- Mayer and Somerville (2000) suggest potential answers.

- They argue real house prices are integrated of order 1, while residential investment is I(0), so co-integration is problematic.

- Secondly, private developers are land speculators: they hope to buy land cheap, add bricks, mortar, labour, glass etc. and sell land plus value added 2-3 years later.

- Hence high (but not perfect) correlation of drivers: house (and land) price overshooting, sensitivity to credit crunches, bad loans to developers can be v. important part of feedback loop.

Greater responsiveness of housing supply does **not** *imply lower volatility of economy-wide prices and lower economic instability*

- Common correlation of drivers implies that where responsiveness is high, residential construction booms accompany house price booms and common overshooting, esp'y in credit-liberal economies.

- 'Hog-cycle' phenomenon due to lags increases volatility: house prices respond more to stock than to flow.

- Stock of housing must lag behind so even elastic stock does not respond 'enough' when demand initially rises. After a series of positive demand shocks, stock has risen and is still rising if demand then reverses, so exacerbating price declines due to excess supply.

- Amplifying macro-feedbacks on income, employment, bad loans.

5. How can we tell if the consumption channel operates?

- Classical life-cycle theory suggests the 'housing wealth effect' on aggregate consumption (including imputed housing) is *small* or *negative*. So rejects net worth formulations.

- *Small and positive* for consumption excluding imputed housing (see Muellbauer, 2007, Jackson Hole paper, http://ideas.repec.org/a/fip/fedkpr/y2007p267-334.html

- or Aron et al (2012), winner of Kendrick prize, *http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1475-4991/homepage/VirtualIssuesPage.html*

- The *credit channel is crucial* to explain impact of house prices on consumption via 2 mechanisms:

- (-) down-payment constraint;
- (+) ability to borrow against home equity, affecting mpc out of housing collateral.

Implications

- *Poorly developed* credit markets (e.g. Italy or Japan) imply aggregate consumption *falls when house prices rise:*

- future first time buyers (and renters) save more for a deposit (or higher future rents), and home-owners have limited access to home equity loans.

- *Deep mortgage markets* imply the opposite:

- Greater access to home equity loans *raises mpc out of housing wealth.*

- We apply LIVES (latent interactive variable equation system) to consumption, mortgage and other debt, and house prices, with latent variables –or when available, bank lending surveys- to capture shifting credit availability.

Findings from my research with Bundesbank and Banque de France economists

- A 10% rise in house prices/income reduces consumer spending by about 0.5% in France and about 0.6% in Germany, all else equal, but small *positive* effect for Spain (*large* in UK & U.S.).

- Key factor: home equity loans effectively currently unavailable in Germany and France; large down-payment ratios.

- *German house price boom will not generate consumer-led eurozone recovery unless it leads to wage growth.*

- Credit liberalisation for housing loans had large effects on house prices and mortgages in France and Spain but small in Germany.

- Downside risk in French housing market comes more from weaker economy than from fragile finance or overbuilding. *Little* risk of U.S.-style financial accelerator in Germany or France.

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6. Non-linearities in the bad-loans feedback loop: understanding payment delinquencies and foreclosures

- Econometric modelling of these data on % of mortgages going into possession and %s with 6-month+ and 12- month+ arrears gives powerful insight into drivers and non-linearities.

- Aron-Muellbauer model used by DCLG.: sensitivity analysis of different scenarios v. useful for stress-testing and calibrating policy response. The 3 key economic drivers are *% in negative equity, debt-service ratio and unemployment rate*.

- Earlier poor lending quality, policy on forbearance and income support for those with payment problems also important.

- % in negative equity is *highly non-linear* function of average house prices. http://ideas.repec.org/p/cep/sercdp/0052.html

7. Conclusions

- 'Sausage machine' approach to many-country data sets not useful unless allowing for complete set of influences, incl. supply side, credit conditions and country heterogeneity. But much to be learned from comparative studies based on institutional knowledge.

- Distinguish between 2 types of overshooting:

- type I due to extrapolative expectations and 'frenzy', given fundamentals: survey data on hp expectations would warn of dangers.

- type II due to fragile fundamentals.

- Credit conditions are often the 'elephant in the room': need bank lending survey.

- Is feedback via consumption present? Are home equity loans common? Measure home equity withdrawal. Is hh debt/income v. high?

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Assessing evolution and potential fragility of fundamentals

- Signs of risky lending: extreme LTVs, LTIs? Bank leverage ratio? Maturity mis-match? Quality of financial regulation? Size of unregulated shadow banking system? FoF data very helpful.

- Is mortgage rate fixed or floating? But note floating rate economies benefitted from rate reductions in GFC.

- Is there much foreign currency debt?

- Other econ fundamentals: exchange rate, foreign demand, terms of trade, reversible capital inflows/outflows, income, unemployment, govt debt/deficit/gdp : current a/c to GDP ratio is often a useful portmanteau indicator of overvalued exchange rate and over-indebted economy.

- Models of early warning of financial and economic crises estimated on large country panels would need to be quite complex.

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Instruments of macro-prudential policy

- Regulation of max LTVs, used with some success in HK and S. Korea.
- LTV regulations also used to curb speculative multiple-unit investors in Singapore.
- Bank of Canada has used limits on max. mortgage duration to limit hh leverage.
- Market-value based national property taxes can be v. useful automatic stabiliser if tax *rate* does not decline with rise in house prices, but political economy is complex.
- Developers are harder to regulate so real-estate sector specific time-varying capital requirements are needed, and shadow banking system needs careful watching.