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Doing Housing Research

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Some Issues

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- **The starting point is to remember that housing is different from financial assets. In addition to being a consumption good, housing has to take into account:**
- **Spatial fixity: heterogeneity & non-divisibility: existence of non-neutralities (taxation, planning): market imperfections (credit constraints).**
- **Leads to research at 3 spatial scales: national, regional, local. But we do not have an integrated theoretical framework.**

The big current research issues: National (Macro)

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- **Housing market volatility**
- **Determinants of house prices, transactions, construction**
- **Transmission mechanism of monetary policy to housing (particularly the effects of the credit crunch, but also the rise in the debt stock and role of securitisation)**
- **Effects of housing on the economy (different approaches)**
- **Regulation**

The big current research issues: National (Macro)

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- **Predictability of house prices (and their measurement) – random walks, efficiency.**
- **Bubbles versus fundamentals (irrational exuberance)**
- **Effects of the tax system**

The big current research issues: National (Micro)

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- **Determinants of household formation**
- **Determinants of tenure choice, including effects of downpayment constraints**
- **Location choices of households**

- **All the above are helped by availability of micro data bases.**

The big current research issues: Regional

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- **Diffusion mechanisms of prices across space, e.g. ripple effects. Statistical properties versus theories**
- **Affordability problems and housing supply**

The big current research issues: Local

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- **Urban segregation and spatial mismatch. The role of place in economic performance.**
- **Hedonic approaches, e.g. valuation of externalities, crime, school quality**
- **Housing sub-market, location and product type.**

Macro Issues (1)

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- **Has the world been through a speculative bubble?**
- **Be careful price volatility tells us nothing about bubbles.**
- **Neither do price to income ratios**
- **Neither do price to rent ratios**
- **Hard to distinguish between bubbles and fundamentals because price expectations are part of user cost.**
- **Well specified models can explain the boom quite well. But poorly specified models bias the results towards bubbles.**
- **Therefore never forget the theory! But be careful of structural reforms.**
- **Hard to incorporate reforms into VARs**

Macro Issues (2)

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- **How does the credit crunch affect model specification?**
- **Through the housing user cost of capital.**
- **High levels of debt affect the geared return.**
- **Sustainability of debt.**

Macro Issues (3)

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- **Effects of housing on the economy.**
- **VAR approaches versus theory**
- **Different results between micro and time-series data.**

Macro Issues (4)

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- Can we forecast house prices?
- Markets are inefficient, so there is information in past prices
- Given spatial lags, further information for prediction available.
- But this is little use for practitioners – error margins are high and cannot predict turning points.
- Therefore I have doubts about the use of univariate models
- Econometric models have lower standard errors, but the problem in forecasting is predicting the independent variables, e.g. interest rates, income. Matters because the elasticities are high.

The standard life-cycle housing model (1)

$$\int_0^{\infty} e^{-rt}\mu(H(t),C(t))dt \qquad (1)$$

Equation (1) is maximised with respect to the period-to-period budget constraint (2) and technical constraints (3) and (4) which describe the evolution of asset stocks (housing and financial) over time.

$$g(t)X(t)+S(t)+C(t)=(1-\theta)RY(t)+(1-\theta)i(t)A(t) \qquad (2)$$

$$\dot{H}(t)=X(t)-\delta H(t) \qquad (3)$$

$$\dot{A}(t)=S(t)-\pi A(t) \qquad (4)$$

where:

$g(t)$	=	real purchase price of dwellings
$X(t)$	=	new purchases of dwellings
$S(t)$	=	real savings net of real new loans
θ	=	household marginal tax rate
$RY(t)$	=	real household income
$i(t)$	=	market interest rate
$A(t)$	=	real net non-housing assets
δ	=	depreciation rate on housing
π	=	general inflation rate
$\dot{(.)}$	=	time derivative

δ, π, θ are assumed to be time invariant

The standard life-cycle housing model (2)

From the first-order conditions, the marginal rate of substitution between housing and the composite consumption good, μ_h / μ_c, is given by (5);

$$\mu_h / \mu_c = g(t)[(1-\theta)i(t) - \pi + \delta - \dot{g}^e / g(t)] \qquad \textbf{(5)}$$

This is the standard definition of the real housing user cost of capital.

However, the user cost of capital has to be amended if credit constraints are binding. The user cost is defined by (6), where the expression takes into account the shadow price of the rationing constraint, *λ(t)*.

$$\mu_h / \mu_c = g(t)[(1-\theta)i(t) - \pi + \delta - \dot{g}^e / g(t) + \lambda(t) / \mu_c] \qquad \textbf{(6)}$$

The standard life-cycle housing model (3)

In a slightly different form, can be expressed as a market efficiency condition or an arbitrage relationship. If *R(t)* represents the real imputed rental price of housing services, arbitrage requires;

$$g(t) = R(t)/[(1-\theta)i(t) - \pi + \delta - \dot{g}^e / g(t) + \lambda(t)/\mu_c] \qquad \textbf{(7)}$$

In practice, R(t) cannot be measured in many countries and is typically substituted out in terms of the possible determinants – usually demographics, housing supply, wealth. Also lags arise because of transactions costs etc. Therefore, most UK studies adopt an error correction approach.

The standard life-cycle housing model (4)

There is a shortage of data in the UK on market or imputed rents to test the price equation directly. Usually in the literature, the expected determinants of rents, are substituted.

$$\Delta \ln(g) = \gamma_1 \Delta \ln(g)_{-1} + \gamma_2 \Delta \ln(X) + \gamma_3 [\ln(g) - \gamma_4 \ln(X)]_{-1} + \mu \qquad \textbf{(10)}$$

$$X' = [RY, RGW, HS, WSH, (M^d - M^S), i, p\dot{h}^e] \qquad \textbf{(11)}$$

RY = **real household disposable income**
RGW = **real wealth**
HS = **housing stock**
$M^{d,s}$ = **mortgage demand, supply**
i = **nominal mortgage interest rate**
WSH = **the share of wages and salaries in household income**
PH = **nominal house price**
$p\dot{h}^e = \pi + \dot{g}^e / g$ = **the expected nominal capital gain on housing.**

The standard life-cycle housing model (5)

The Discount Rate becomes:

$$DISCR = [(1-\theta)i(t) + \delta - \gamma(\pi + \dot{g}^{e} / g(t)\ ) + \alpha_1(M^{d} - M^{s}) + PT + ST] \qquad (12)$$

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Empirical Results – House Prices

***Table 3*. House Prices: Dependent Variable = *Δln(g)*, 1969Q2 – 2007Q2**

Variable	Coefficient	t-value
Constant	-1.1346	-4.35
$ln(g)_{-1}$	-0.0905	-6.56
DISCR	-0.0054	-13.82
$ln(RGW)_{-1}$	0.0245	2.81
ln(RY)	0.1908	3.61
$\Delta ln(RY)_{-1}$	0.0810	1.80
$ln(HS)_{-1}$	-0.1377	-2.87
WSH_{-1}	0.3669	3.65

R-squared	0.78	Reset; F(1,138) = 1.81 (p=0.181)
Adjusted R-squared	0.76	LM: F(4,135) = 2.28 (p=0.064)
S.E. of regression	0.0158	Arch: F(4,144) = 0.33 (p=0.86)
Durbin-Watson stat	1.88	Chow: F(42,97) = 1.85 (p=0.007)

The equation also includes seasonal dummy variables and dummies to allow for the effect of abolishing double mortgage tax relief in 1998.

Evidence of over-valuation?

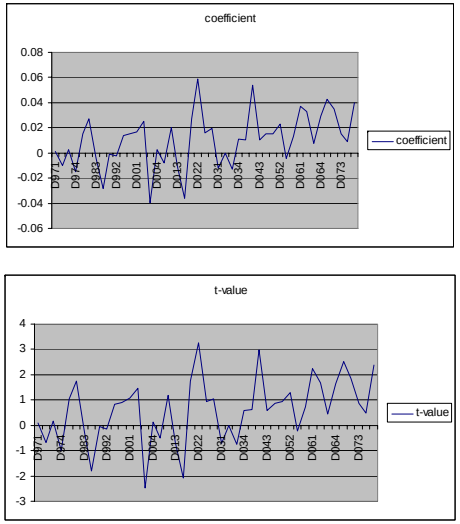

***Figure13*. Dummy Variable Coefficients and t-values**

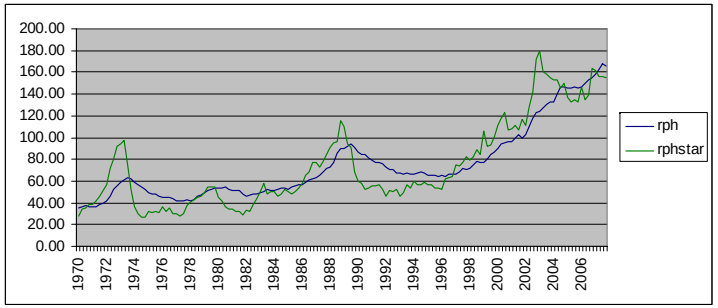

***Figure 14*. Actual Real House Prices (rph) and Equilibrium Prices (rphstar)**

Long-Run Solution

$$\ln(g) = -12.537 - 0.059DISC + 0.271\ln(RGW) + 2.108\ln(RY) - 1.522\ln(HS)$$

Income elasticity of housing demand = 1.39

Price elasticity of housing demand = -0.66

g = real house prices; DISC = housing discount rate; RGW = real wealth; RY = real income; HS = housing stock

Note that prices are very responsive to a change in income, interest rates (for a given value of the housing stock). Therefore, small forecasting errors for (RY) or (DISC) lead to big errors in forecasting house prices, even if the equation was perfect and the coefficients were time invariant. Leads to doubts about price forecasts.