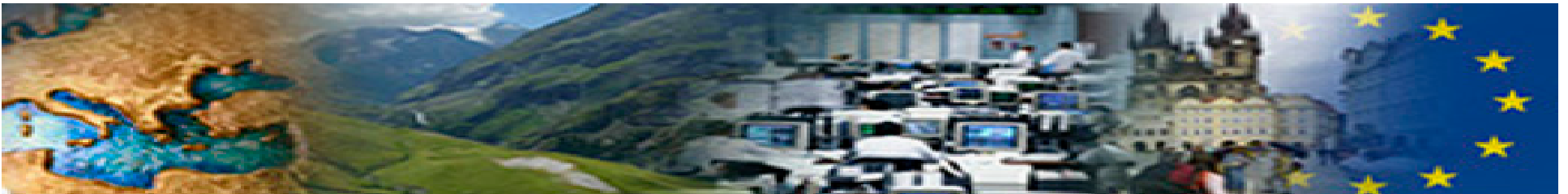


House Price Developments in Europe: A Comparison and the Downturn

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joint work with:
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Today's presentation

- Stylized facts
- Empirical evidence
- Concluding remarks

Stylized facts

- i- Country groups
- ii- House prices and rental prices
- iii-Factors: output, user costs, & demographic

i-Country groups

Table 2. Real House Price Index (1985=100)

	2007	Average 2005-2007	Average 1970-2007	Deviation from Average 2007	Standard Deviation	Year-on-Year Increase in		
						2005	2006	2007
Fast lane								
Spain	395	314	182	213	83	10.2	6.8	2.9
Ireland	361		155	206	79	9.1	8.4	2.8
Belgium	360		163	197	71	15.2	8.8	5.0
Netherlands	328		173	155	73	2.4	3.6	3.5
United Kingdom	302		137	165	62	3.0	3.8	8.3
France	229		126	104	35	9.8	5.8	1.8
Average	329	156	173	67	8.3	6.2	4.1	
Average performers								
Sweden	209	174	130	79	27	7.8	11.2	8.8
Norway	207		108	99	32	6.8	10.6	11.6
Denmark	197		105	92	29	15.2	19.1	2.6
Italy	180		124	55	26	5.3	3.8	2.6
Finland	159		106	53	24	5.6	5.8	4.3
Greece	154		135	19	24	3.7	-2.6	-3.0
Average	184	118	66	27	7.4	8.0	4.5	
Slow movers								
Portugal	106	93	107	-1	5	0.1	-0.9	-1.3
Switzerland	98		98	1	13	0.5	0.8	1.3
Germany	85		102	-17	7	-3.4	-1.3	-1.7
Austria	83		87	-4	13	2.9	1.7	1.5
Average	93		98	-5	10	0.0	0.1	-0.1
Comparison								
United States	175	172	112	63	23	8.6	5.3	0.3

Source: Bank for International Settlements.

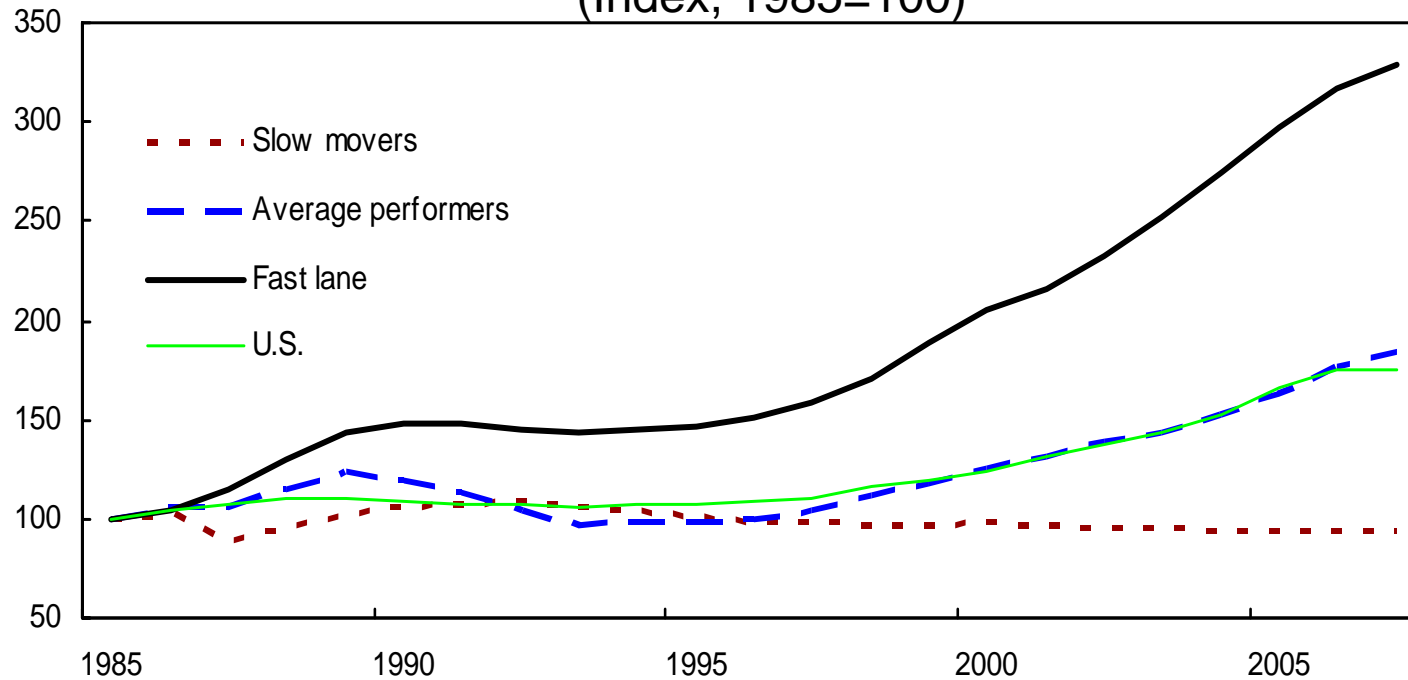
+100%

50-100%

flat -

ii-House and rental prices

Figure 2. Average Real Property Prices, 1985-2007
(Index, 1985=100)

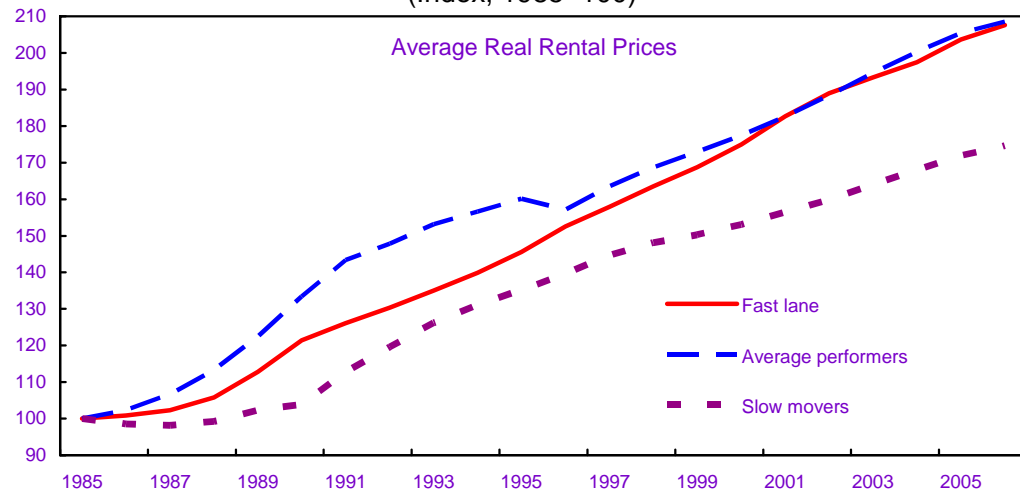


Sources: Bank for International Settlements; and Barclays.

ii-House and rental prices

Figure 9. House Prices and Rents, 1985-2006
(Index, 1985=100)

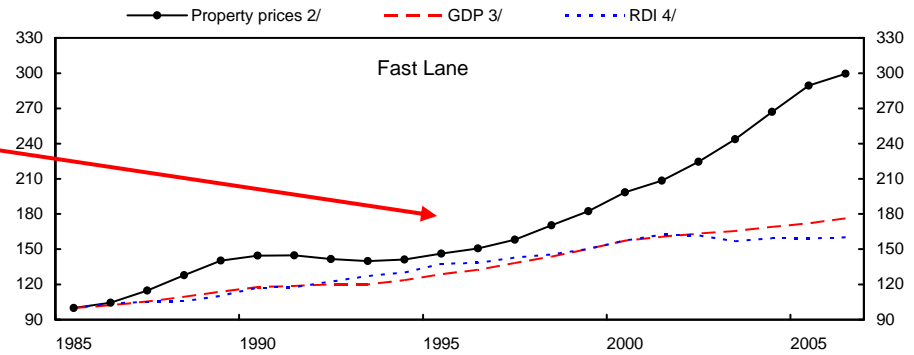
Rental prices
have increased
In all sub-groups



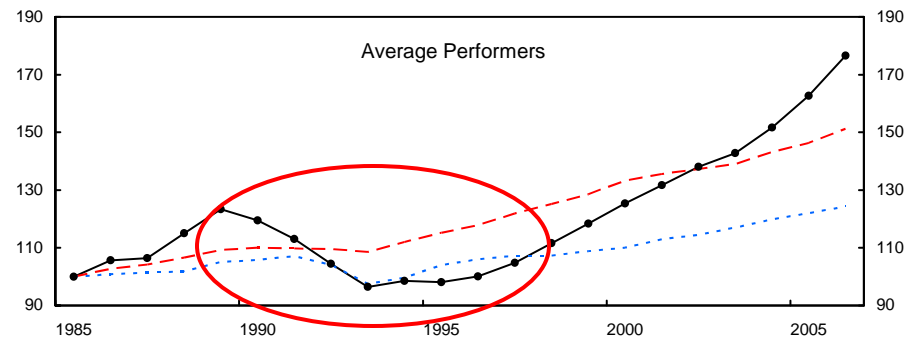
Sources: Bank for International Settlements; Barclays; and European Mortgage Federation.

Figure 3. House Prices and Income, 1985-2006 1/
(Index, 1985=100)

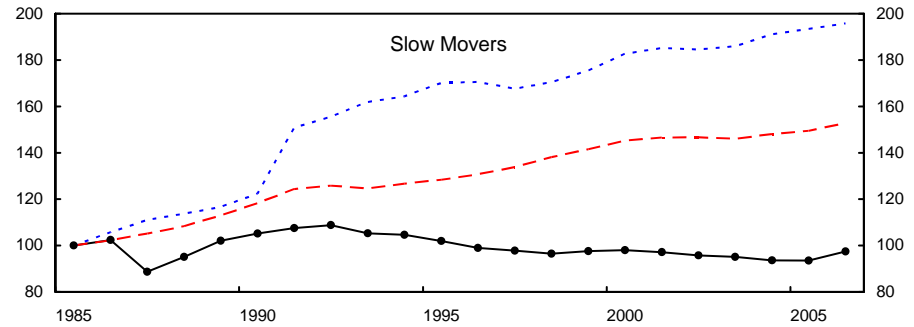
some "+" correlation
but $\Delta p > \Delta y$
since mid-90's



"higher correlation"
...but not "p" cycle in the 90's



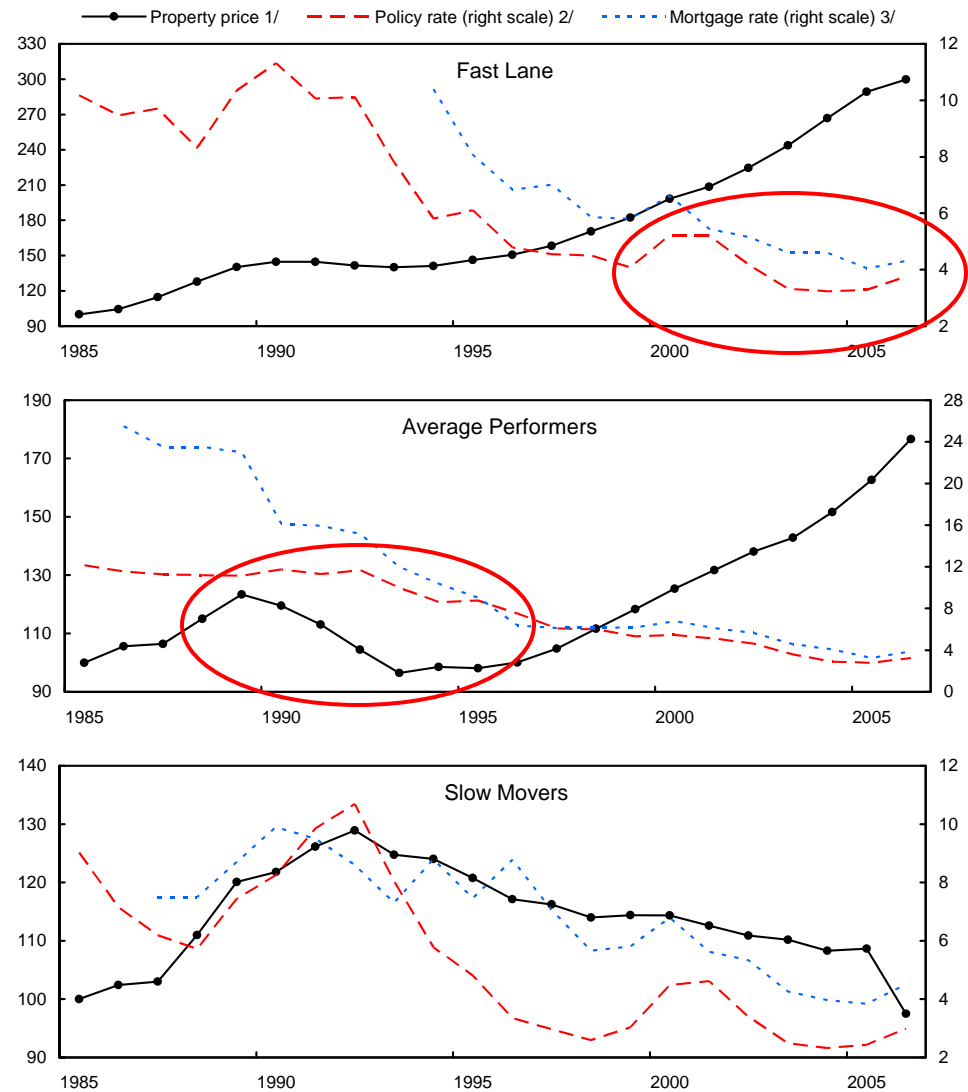
If any, "-" correlation?



Sources: Barclays; Bank for International Settlements; European Mortgage Federation; IMF, *World Economic Outlook*; OECD; and IMF staff calculations.
1/ All variables are presented as Index 1985=100, corrected for breaks in series.
2/ Real house prices.
3/ Real per capita GDP (national currency).
4/ Real gross disposable income per capita (national currency).



Figure 4. House Prices and Interest Rates, 1985-2006

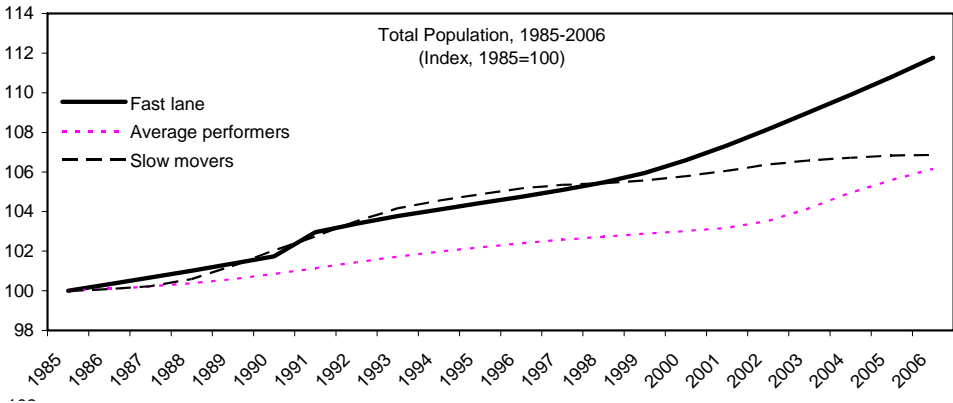


“-” correlation in fast & avg. but
 Fast: rates flat end-smpl
 Avg: don't see cycle

slow: perverse correlation?

Sources: Bank for International Settlements; European Mortgage Federation; and Eurostat.
 1/ Real house prices (index, 1985=100).
 2/ In percent.
 3/ Representative interest rate on new mortgage loans, in percent.

Figure 5. Demographics, 1985-2006



Demographic shows upward trend.
 ...empirically difficult to disentangle
 from output.



Sources: Eurostat; and Fund staff calculations.

Today's presentation

- Stylized facts
- Empirical evidence
- Concluding remarks

Empirical Evidence

Main results

- Standard model fits Europe well:

$$\log(P / \text{Rent}) = f(\overset{(-)}{uc}, \overset{(+/-)}{demog}, \overset{(+)}{\log(y)});$$

- House price developments: output related;
- Slow movers, however, are a puzzle;
- Extended model results tentative;
- Overvaluation requires a judgment call;
- Fast lane more sensitive to fundamentals; and
- Slowdown: fast lane Δ 's in overvaluation largest.

Empirical Results

- Standard model
(including an aside on user costs)
- Estimates
(including understanding developments)
- Extended model
- Overvaluation
- Note on the slowdown

Standard model

$$\log(P_{i,t}) = \overset{(-)}{\tilde{\beta}_{i,1}} \cdot uc_{i,t} + \overset{(+)}{\tilde{\beta}_{i,2}} \cdot demog_{i,t} + \overset{(+)}{\tilde{\beta}_{i,3}} \cdot \log(y_{i,t}) + \tilde{\mu}_{i,t}$$

Second version

$$X_i' \cdot \beta_i + \sum_{i=j_i}^{-J_i} (\Delta X_i' \cdot \Gamma_i) + \mu_{i,t}$$

$$\mu_{i,t} = \beta_{i,0} + \varepsilon_{i,t}$$

Estimation:

Slope heterogeneity

Fixed effects

MGE-DOLS (Pedroni, 2001)

$$\beta^{MGE} = \frac{1}{n} \sum_{i=1}^n \hat{\beta}_i$$

Aside on user cost (total annual cost of ownership)

$$UC_{i,t} = r_{i,t}^{RF} + \tau_{i,t}^{PROP} - \tau_{i,t}^{PIT} \times (\tau_{i,t}^{PROP} + r_{i,t}^m) + \delta_{i,t} - g_{i,t+1} + \gamma_{i,t}$$

foregone interest of a risk-free investment;
property taxes;
offset from deductions in property taxes
and mortgage interest payments;
maintenance costs;
offset from expected (net) capital gains; and
a risk premium of owning versus renting.

Δ user cost \neq Δ interest rates

$$uc_{i,t} = r_{i,t}^{RF} + \tau_{i,t}^{PROP} - \tau_{i,t}^{PIT} \times (\tau_{i,t}^{PROP} + r_{i,t}^m) - (1 - \tau_{i,t}^g) \cdot g_{i,t+1}$$

$$\frac{\partial uc}{\partial r^{RF}} = \left[1 - \tau_{i,t}^{PIT} \cdot \frac{\partial r_i^m}{\partial r^{RF}} - (1 - \tau_{i,t}^g) \cdot \frac{\partial g_i}{\partial r^{RF}} \right] > 0$$

1-Direct

2-Financial markets

3-Expected gains

4-Tax system

“Common”

Country specific

User cost in Europe

$$(uc = r^{RF} + \{1-\tau^{PIT}\} \times \tau^{PROP} - \tau^{PIT} \times r^m - \{1-\tau^g\} \times g)$$

	Contribution of:							2nd order
	Δuc	Δr^{RF}	$\Delta \tau^{PROP}$	$\Delta \tau^{PIT}$	Δr^m	Δg	$\Delta \tau^g$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Europe	-2.6	-1.8	0.0	0.1	0.4	-1.2	0.0	-0.1
	-1.9	-1.5	0.0	0.1	0.4	-0.8	-0.1	0.0
	-3.8	-2.3	0.0	0.0	0.4	-1.9	0.0	0.0
	-1.9	-1.5	0.0	0.2	0.4	-0.8	0.1	-0.2

Note: The contributions of the changes in property taxes, personal income tax rate, mortgage rate, capital gains and capital gain tax rates (columns 3-7) reflect the scaling--namely, $\{1-\tau^{PIT}\}$, $-\{\tau^{PROP}+r^{LR}\}$, $\{-\tau^{PIT}\}$, $\{1-\tau^g\}$, and g , all in 1995--required by the difference operator; the three corresponding second order (change) terms were grouped in column 8.

Sources: EUROSTAT, European Tax Handbook (several editions) and Fund staff estimates.

Empirical Results

- Standard model
(including an aside on user costs)
- **Estimates**
(including understanding developments)
- Extended model
- Overvaluation
- Note on the slowdown

Standard model estimates, log(P/Rent)

Standard Model Estimates for $P/Rent$.

	Right hand side variable					
	User cost		Demog		Output	
	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
Panel MGE estimates	-0.73	-8.27 **	-7.74	-4.35	0.38	4.17 **
Fast lane	-0.49	-3.76 **	-11.27	-11.01 **	1.02	12.90 **
Average performers	-0.72	-4.07 **	-6.01	? 6.10 **	0.51	3.19 **
Slow movers	-1.12	-6.95 **	-5.05	2.68	-0.76	-11.37 **

Note: * (**) denotes rejections of null hypothesis at the 5 (1) percent significance level. Estimates for individual countries are obtained from using DOLS, with leads and lags determined by testing down from a maximum of 1. Estimates for the panel and subgroups are mean group estimates.

Source: Fund staff estimations.

Standard model estimates, log(P)

Standard Model Estimates for P

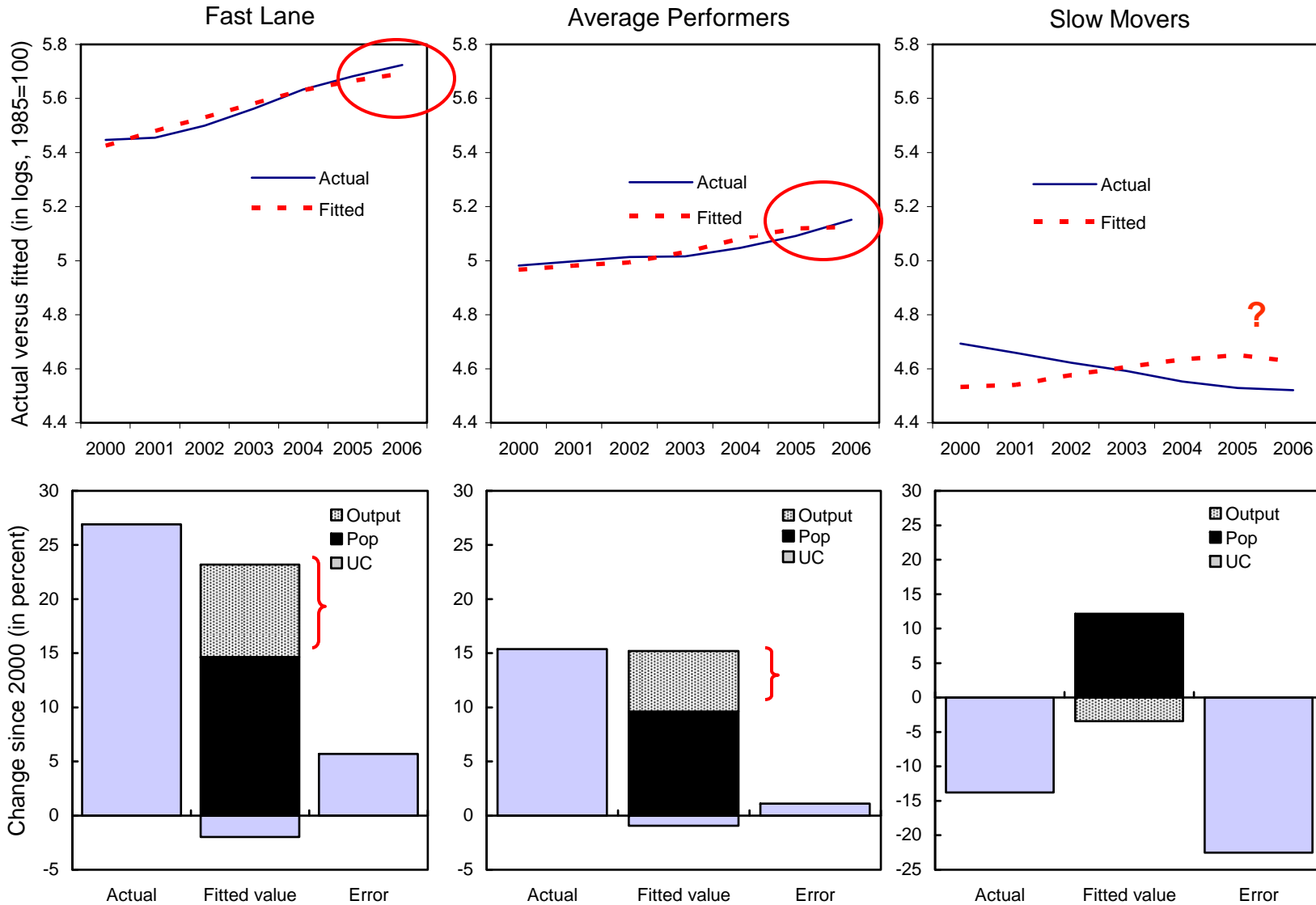
	Right hand side variable					
	User cost		Demog		Output	
	Coefficient	T-Stat	Coefficient	T-Stat	Coefficient	T-Stat
Panel MGE estimates	0.02	1.26 **	-3.96	-0.63 **	1.75	30.44 **
Fast lane	0.19	-0.20	-8.15	-2.00 **	2.43	13.44 **
Average performers	-0.03	-0.13 *	-1.55	0.29	1.74	12.09 **
Slow movers	-0.15	-1.76	-1.29	-5.09	0.74	5.75 **

Note: * (**) denotes rejections of null hypothesis at the 5 (1) percent significance level.

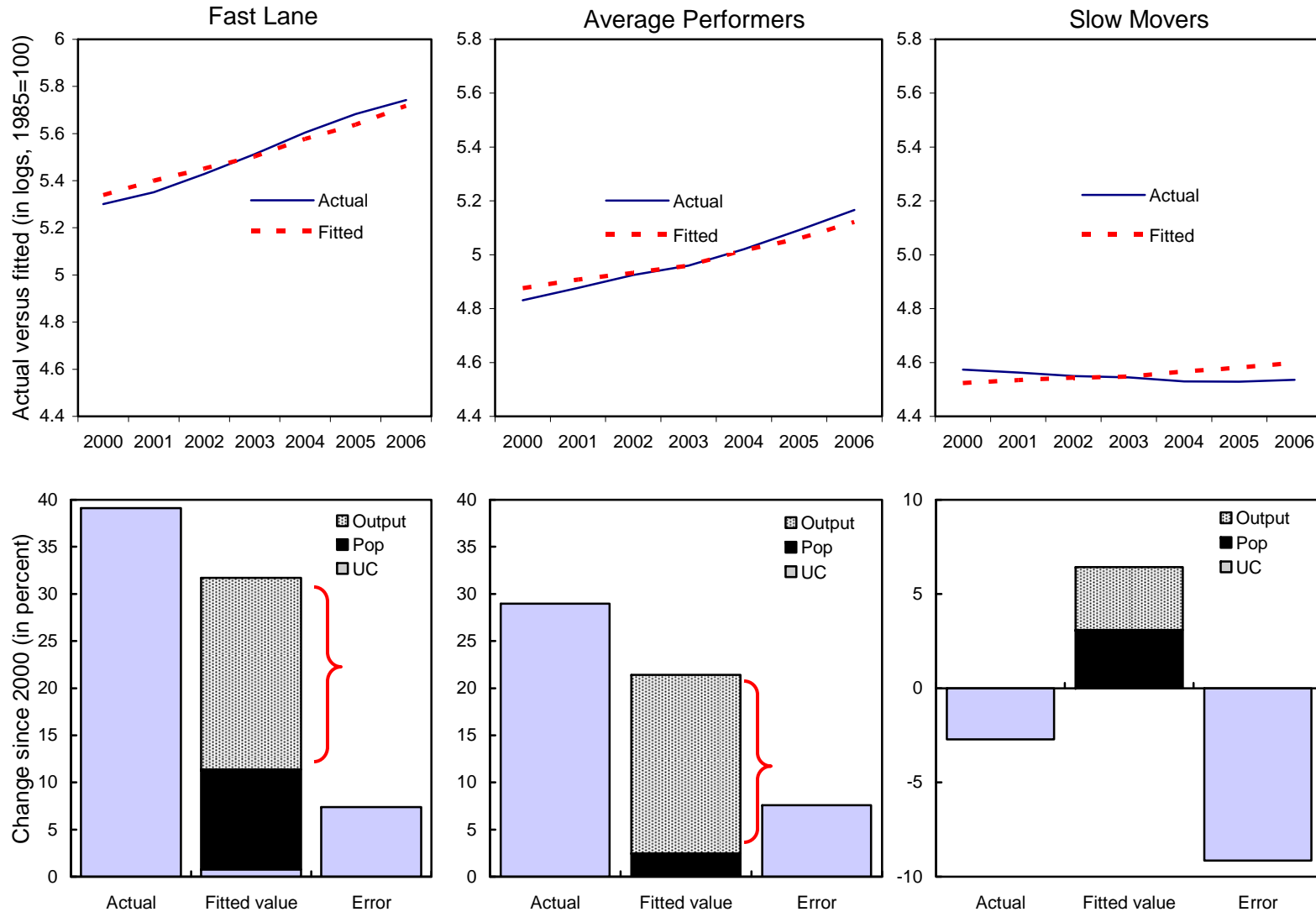
Source: Fund staff estimations.



Understanding $\log(P/\text{Rent})$



Understanding log(P)



Empirical Results

- Standard model
(including an aside on user costs)
- Estimates
(including understanding developments)
- **Extended model**
- Overvaluation
- Note on the slowdown



Extended model

issue: limited time-variation of fundamentals

$$\log(P_{i,t} / \text{Rent}_{i,t}) = \beta_1 \cdot uc_{i,t} + \beta_2 \cdot demog_{i,t} + \beta_3 \cdot \log(y_{i,t}) + \mu_{i,t}$$

$$X_t' \cdot \beta + z_i \cdot \varphi + \mu_{i,t}$$

$$\mu_{i,t} = \beta_{i,0} + \varepsilon_{i,t}$$

Estimation:

Common slopes

Fixed effects

Hausman-Taylor procedure

- 1-Home ownership (“+”)
- 2-Stock of dwellings (“-”)
- 3-Share of social housing (“-”)
- 4-Share of housing wealth (“+”)

Extended model (common slopes)

	<i>P/Rent</i>		<i>P</i>	
	MGE	DOLS-FE	MGE	DOLS_FE
User cost	-0.73 **	-2.12 **	0.02 **	-0.70 **
	-8.27	-10.24	1.26	-6.29
Demog	-7.74	-2.44	-3.96 **	0.27
	-4.35	-1.92	-0.63	0.40
Output	0.38 **	-1.04 **	1.75 **	0.86 **
	4.17	-10.73	30.44	15.53

estimates jump; and
tests rejected common slopes

Extended model (tentative results)

	P/Rent				
	DOLS-FE	Model 1	Model 2	Model 3	Model 4
Standard regressors:					
User cost	-2.12 ** -10.24	-0.74 ** -2.82	-0.71 ** -2.81	-1.21 ** -5.47	-1.27 ** -5.53
Demog	-2.44 -1.92	-0.40 -0.32	-2.10 * -1.78	-0.68 -0.58	-0.70 -0.56
Output	-1.04 ** -10.73	-0.27 ** -2.42	-0.05 -0.49	-0.53 ** -5.53	-0.58 ** -5.60
Time-invariant regressors:					
H_ownership		-0.01 ** -3.14	?		
Dwellings			-0.07 ** -5.29		
Social_sh				-0.01 -0.46	
H_wealth_sh					0.001 0.26
J-stat		0.10	13.24 **	6.85 **	3.26

Empirical Results

- Standard model
(including an aside on user costs)
- Estimates
(including understanding developments)
- Extended model
- **Overvaluation**
- Note on the slowdown

Overvaluation (conditional statement)

$$\text{OVER}_{i,t} \equiv \log(P_{i,t} / \text{Rent}_{i,t}) - \log(\bar{P}_i / \text{Rent}_i)$$

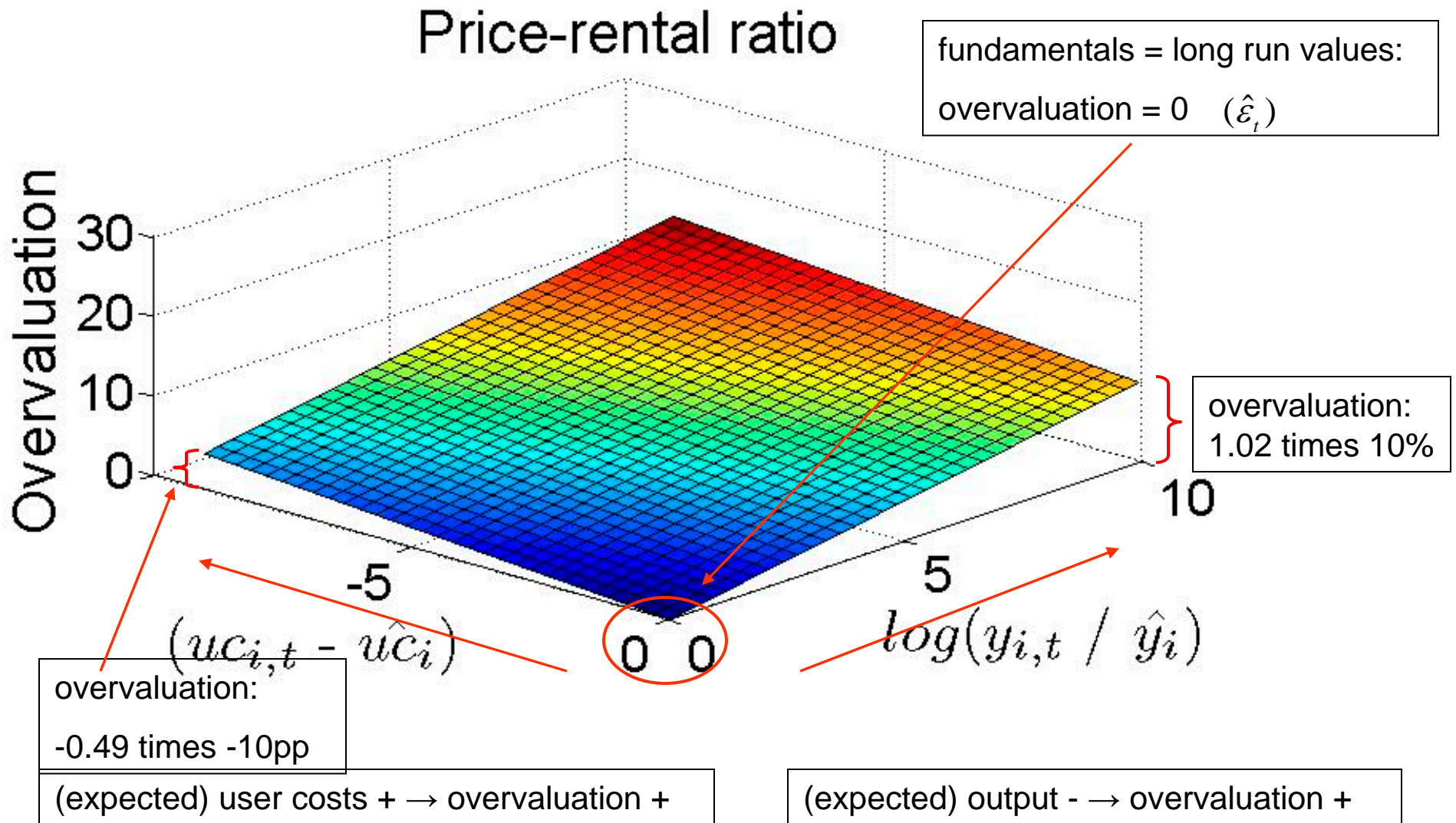
$$\hat{\beta}_1^{MGE} \cdot uc_{i,t} + \hat{\beta}_2^{MGE} \cdot demog_{i,t} + \hat{\beta}_3^{MGE} \cdot \log(y_{i,t}) + \hat{\varepsilon}_{i,t}$$

$$- \left[\hat{\beta}_1^{MGE} \cdot \bar{uc}_i + \hat{\beta}_2^{MGE} \cdot \bar{demog}_i + \hat{\beta}_3^{MGE} \cdot \log(\bar{y}_i) \right]$$

$$= \hat{\beta}_1^{MGE} \cdot (uc_{i,t} - \bar{uc}_i) + \hat{\beta}_2^{MGE} \cdot (demog_{i,t} - \bar{demog}_i) + \hat{\beta}_3^{MGE} \cdot \log\left(\frac{y_{i,t}}{\bar{y}_i}\right) + \hat{\varepsilon}_{i,t}$$

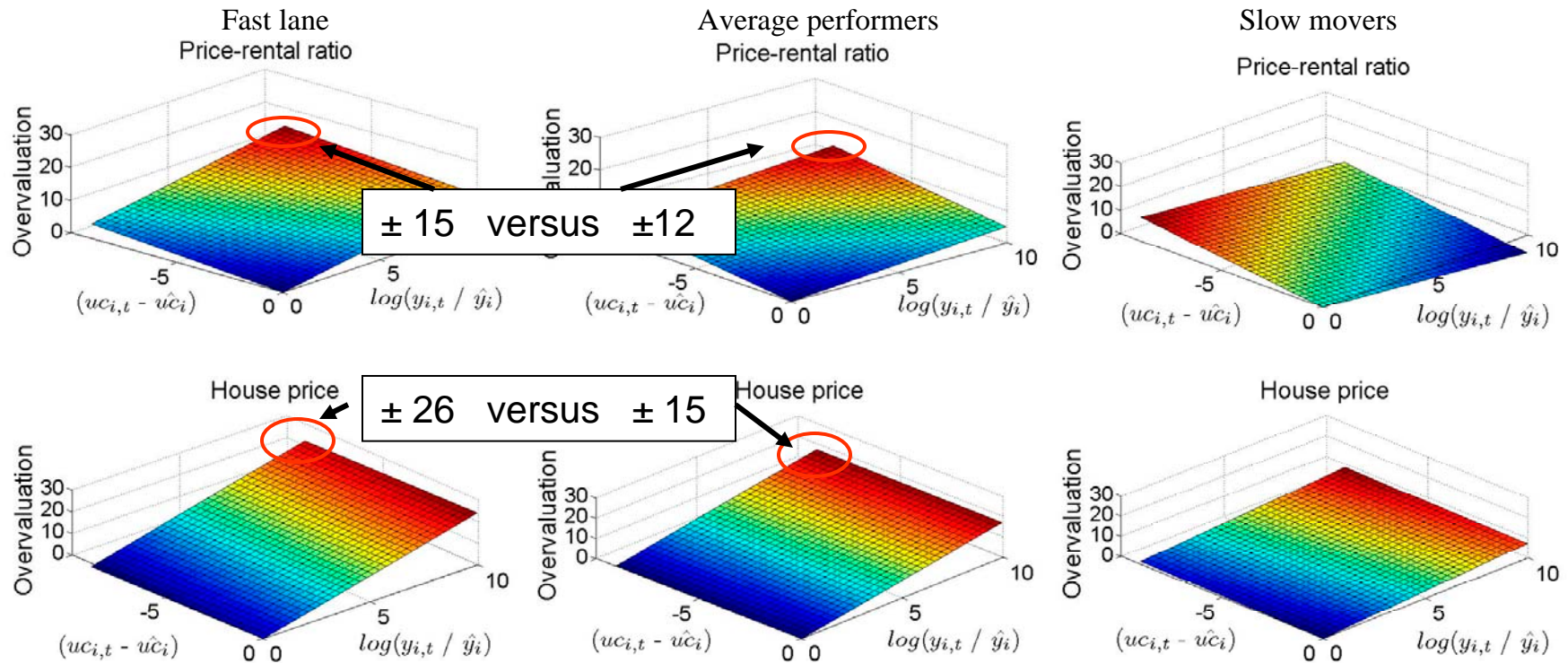
(Not bubble: “fuzzy word filled with import but lacking a solid operational definition,” Peter Garber, 2000.)

Overvaluation plane (fast lane)



Overvaluation planes

Figure 18. Overvaluation in Housing Markets in Europe 1/
(Percent)



Source: IMF staff calculations.

1/ Movements away from the origin along the user cost (or the output per capita) axis represent an increase (decrease) in uc_i (\hat{y}_i).

Interest rates and overvaluation ($\Delta uc \neq \Delta r$)

Table 15. Overvaluation resulting from an Increase in Interest Rates
(In basis points, unless otherwise indicated)

	Fast lane	Average performers	Slow movers
Short run interest rate increase	100	100	100
Resulting increase in user costs	141	169	65
Change in overvaluation (in percent)			
Price rental ratio	0.7	1.2	0.7
House price	-0.3	0.0	0.1

Source: IMF staff calculations.

Notes: Calculations reflect the estimated responses of user costs to interest rates (Table 14) and the semielasticities of p/r : + sensitive in avg. performers (Tables 10 & 11).

Empirical Results

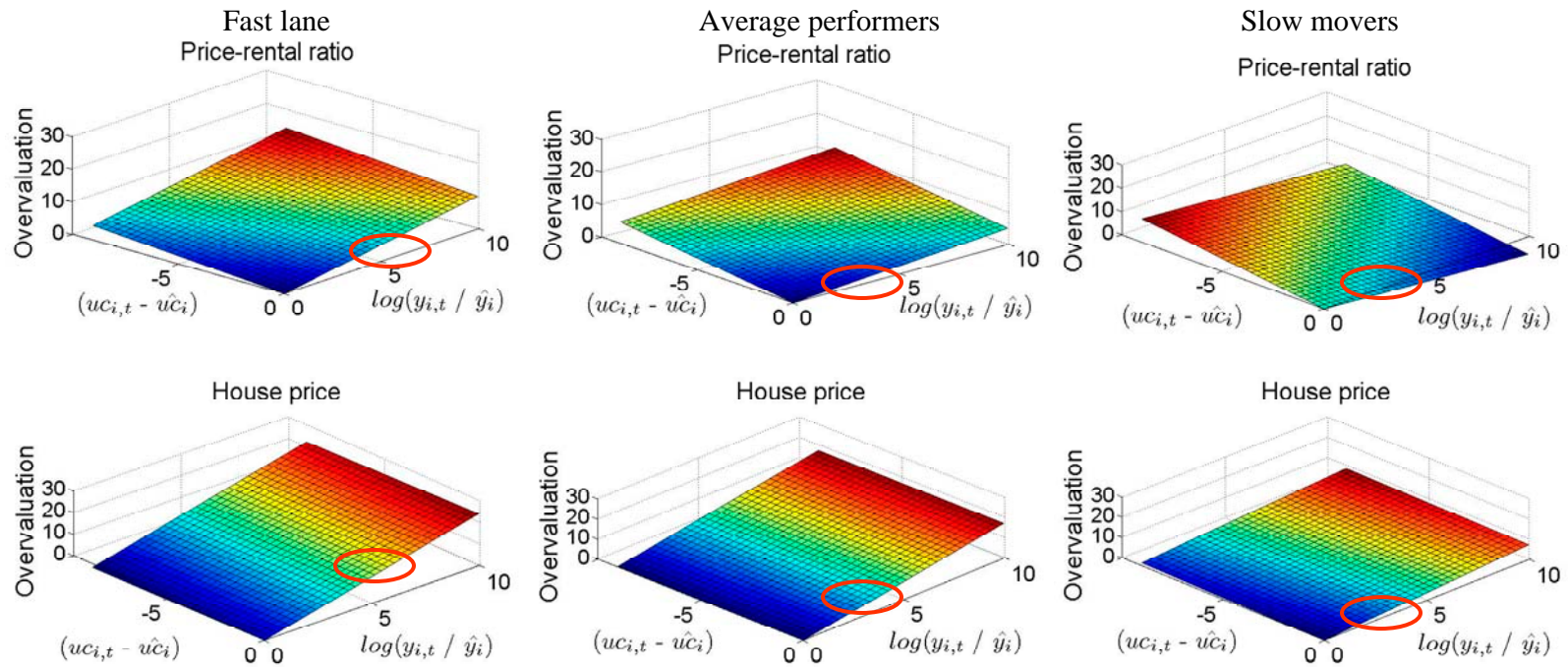
- Standard model
(including an aside on user costs)
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- Overvaluation
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slowdown (output effect)

	Output per capita, 2007-10. (percent change)		Predicted change in overvaluation			
	2007-09	2007-10	P/r		P	
Fast Lane	-5.4	-6.6	5.5	6.7	13.0	16.0
Spain	-4.9	-6.2				
Ireland	-12.2	-15.0				
Belgium	-4.2	-4.7				
Netherlands	-3.5	-4.6				
United Kingdom	-4.2	-5.7				
France	-3.3	-3.4				
Average performers	-3.6	-4.3	1.8	2.2	6.2	7.4
Sweden	-4.3	-5.0				
Norway	-1.4	-1.6				
Denmark	-5.9	-5.8				
Italy	-6.9	-7.9				
Finland	-4.9	-6.3				
Greece	2.1	1.3				
Slow movers	-3.6	-4.0	-2.7	-3.0	2.7	2.9
Portugal	-4.5	-5.2				
Switzerland	-3.9	-3.9				
Germany	-4.2	-5.0				
Austria	-1.8	-1.8				
Average						
Comparison						
United States	-3.5	-4.5				

Based on WEO projections, April 2009.

Figure 18. Overvaluation in Housing Markets in Europe 1/
(Percent)



Source: IMF staff calculations.

1/ Movements away from the origin along the user cost (or the output per capita) axis represent an increase (decrease) in uc_i (\hat{y}_i).

The downturn

- Model's limitations

- unidirectional: macro to prices
- role of expectations in user costs (fixed)
- long run prices: undershooting not captured

Partial
equilibrium

Static model

Today's presentation

- Stylized facts
- Empirical evidence
- **Concluding remarks**



In sum,

- Standard model fits Europe well;
- House price developments: output related;
- Slow movers, however, are a puzzle;
- Extended model tentative;
- Overvaluation requires judgment call;
- Fast lane more sensitive to fundamentals; and
- Slowdown: fast lane Δ 's in overvaluation largest.

Conclusion of slide presentation

