

House prices in Denmark and Sweden

U. Michael Bergman

Peter Birch Sørensen

Department of Economics
University of Copenhagen

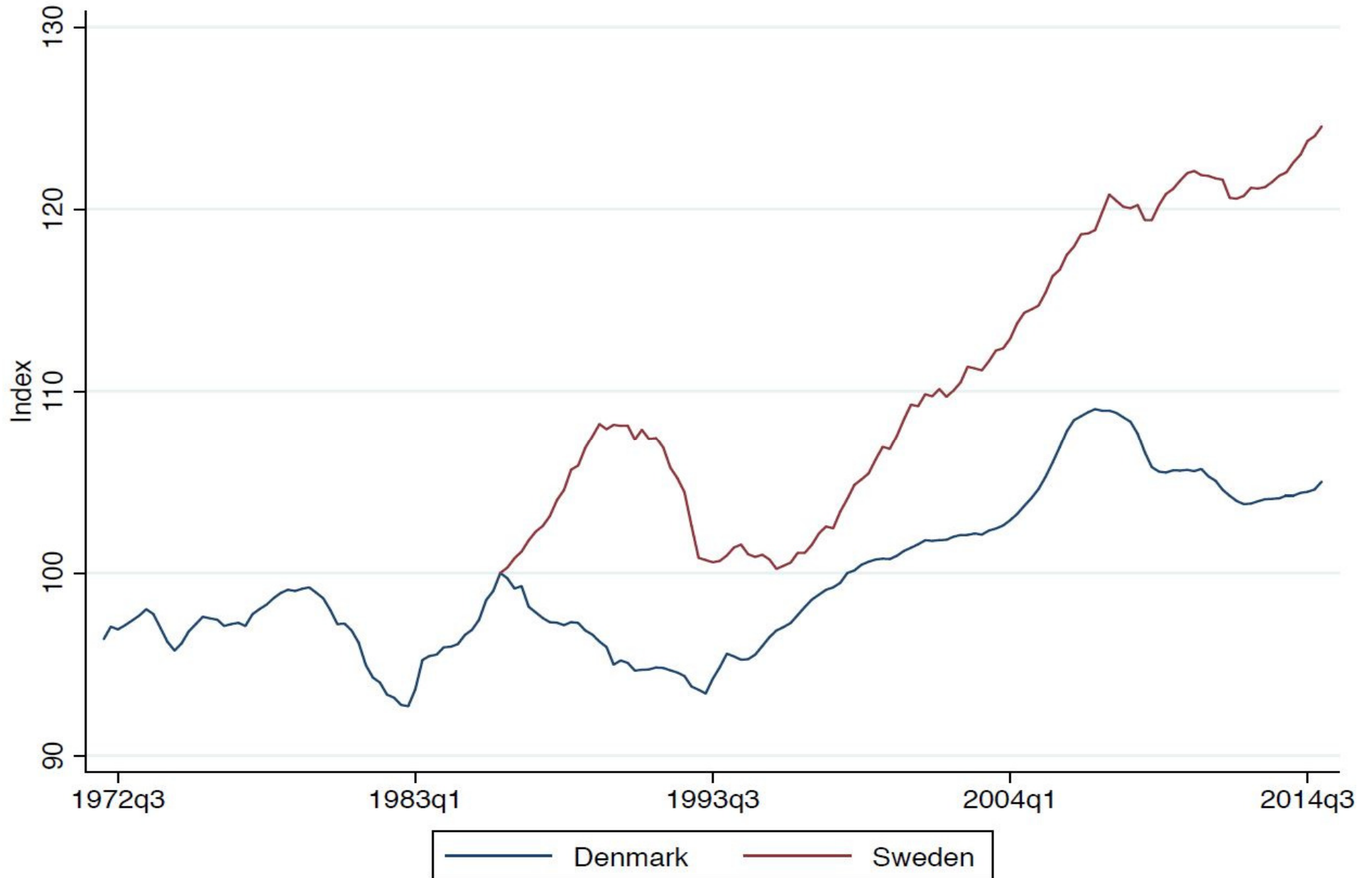
Presentation at the workshop on
*House price bubbles – How to
detect, predict and prevent them*

at Danmarks Nationalbank, September 20, 2016

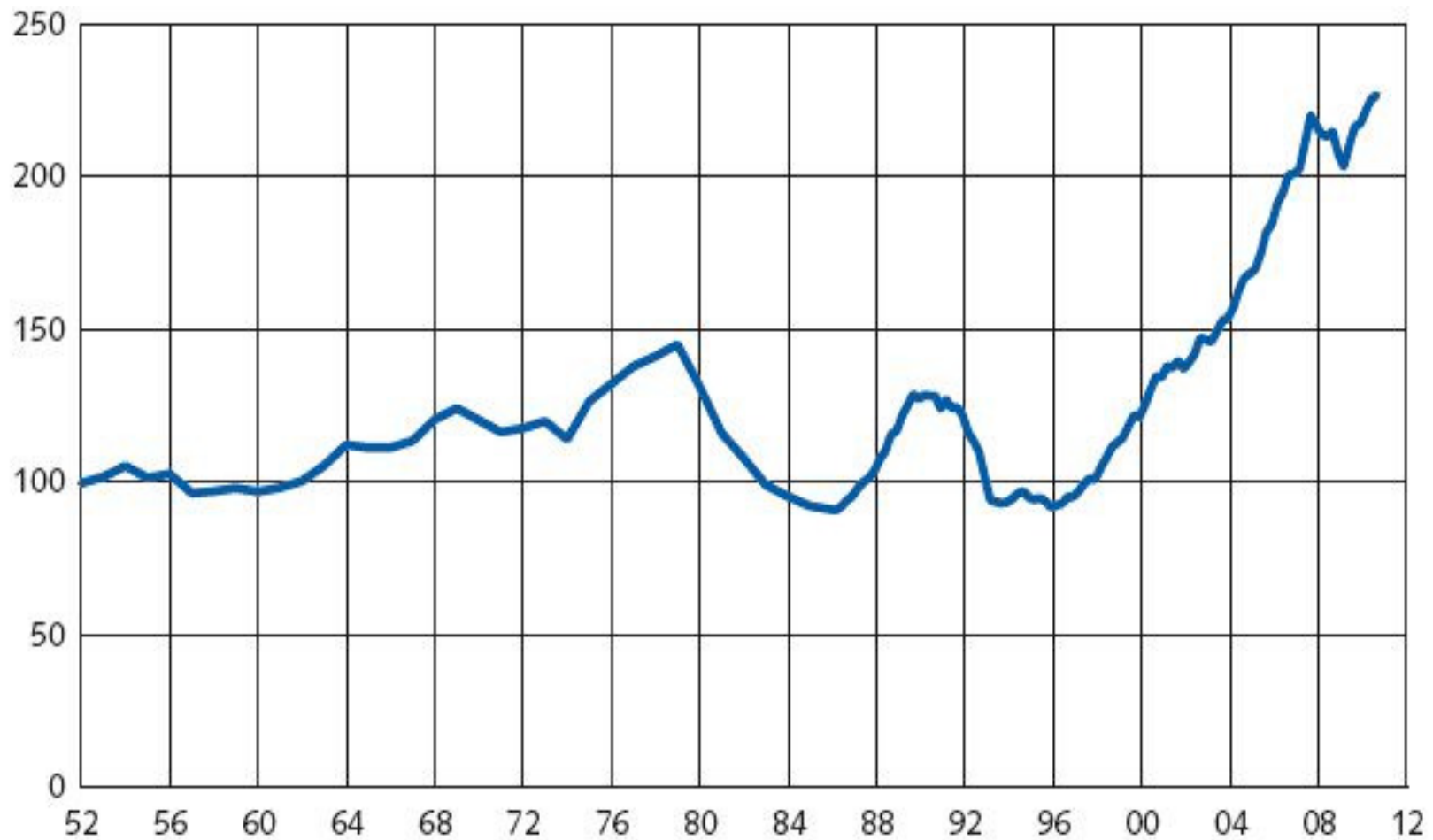
The issues

- How can we estimate fundamental house prices?
- What is the relationship between actual and fundamental house prices?
- Are the housing markets in Denmark and Sweden currently overvalued?
- How will a policy reform that raises the user cost of housing affect house prices?

Quarterly real house prices in Denmark and Sweden (1986:1=100)



Real house prices in Sweden: A longer view



Note: Annual data from Statistics Sweden.

Fundamental house prices in Denmark and Sweden

The fundamental house price

- Utility maximization: *Value of housing service \equiv imputed rent = user cost (including expected capital gain)*

Implication when consumers are forward-looking:

- *Fundamental house price = discounted value of rationally expected future imputed rents*

(Note: discount rate = user cost excluding expected capital gain)

“Supply and demand (S-D)” model of fundamental house price

Assumptions:

- Imputed rents (user costs) on owner-occupied housing adjust so as to equilibrate housing demand and housing supply
- Housing demand varies positively with real disposable income and negatively with imputed rents

Implication:

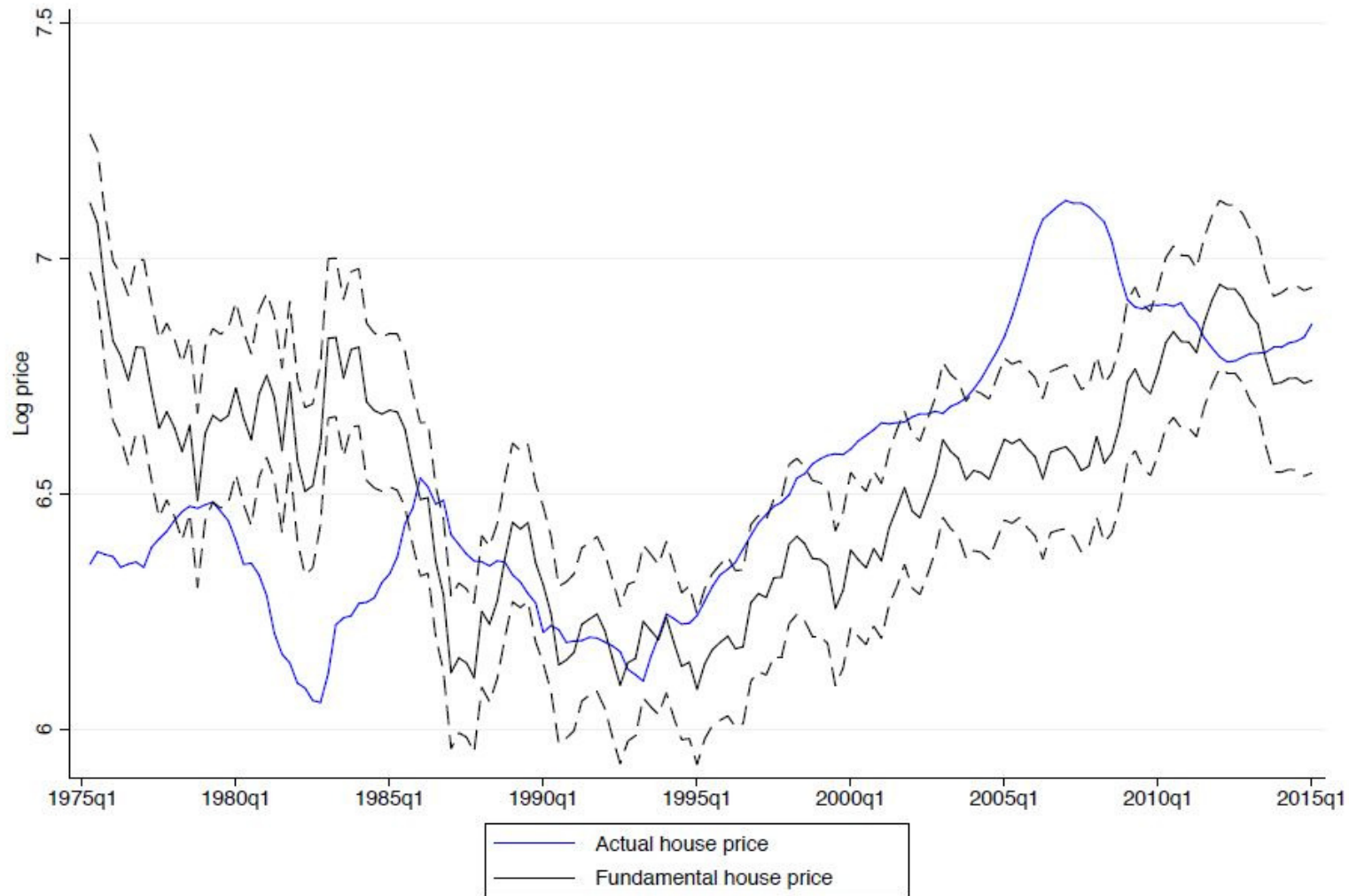
- Expected future imputed rents depend on expected future incomes and the expected future housing stocks

Empirical implementation

- Expectations of future imputed rents and future user costs are based on a VAR model of the historical interaction between incomes, rents (in rental housing), user costs, housing investment and actual house prices
- Income and price elasticities of housing demand are chosen exogenously on the basis of prior knowledge
- Estimation procedure imposes the restriction that the average levels of actual and fundamental house prices are identical over the estimation period
- Estimates are based on quarterly data for Denmark from 1974:1 to 2015:1 and quarterly data for Sweden from 1986:1 to 2015:1

Actual and estimated fundamental real house prices in Denmark

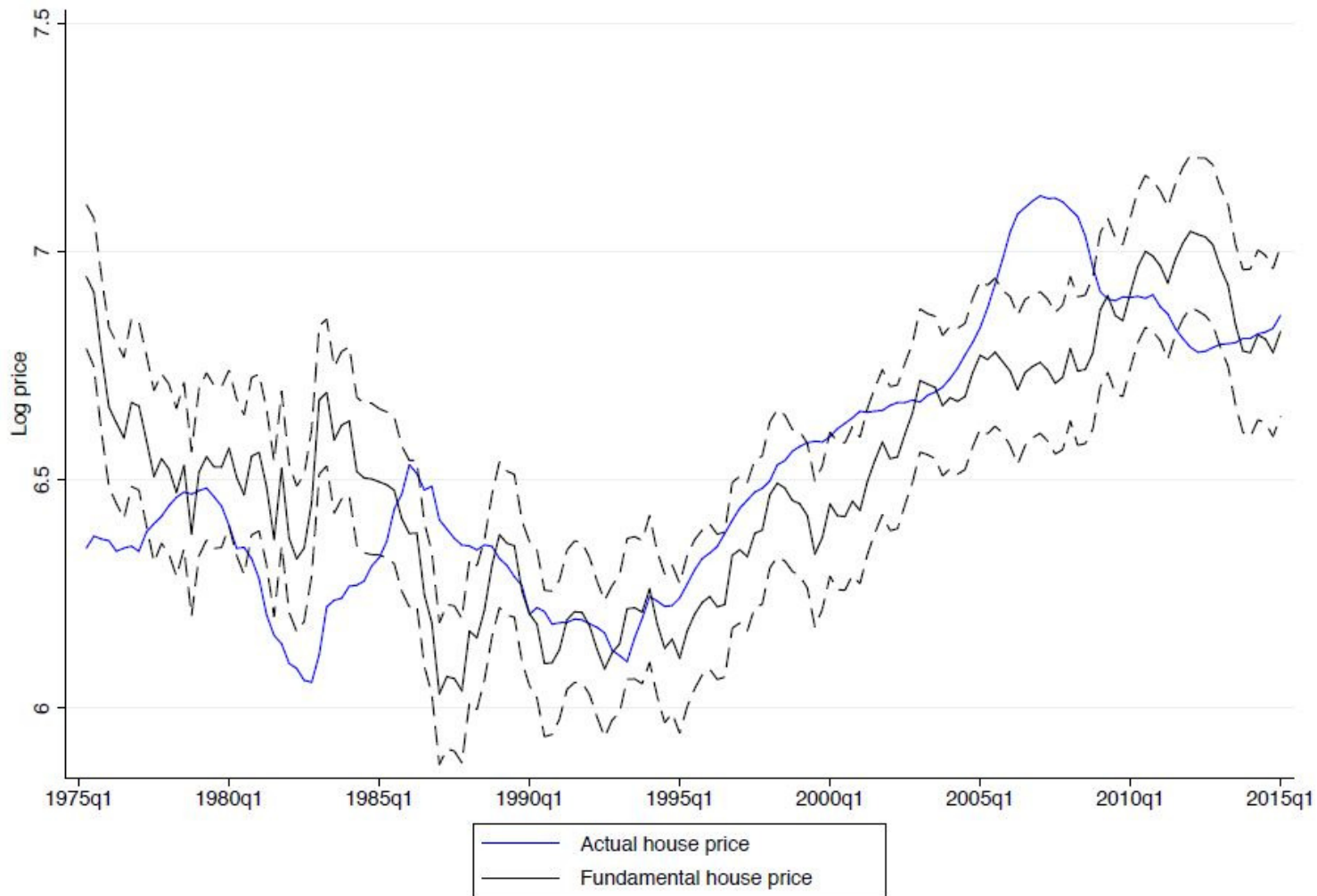
Income elasticity of housing demand = 1.0 Price elasticity of housing demand = -1.0



Note: Dotted lines indicate 90% confidence bands for the fundamental house price.

Actual and estimated fundamental real house prices in Denmark

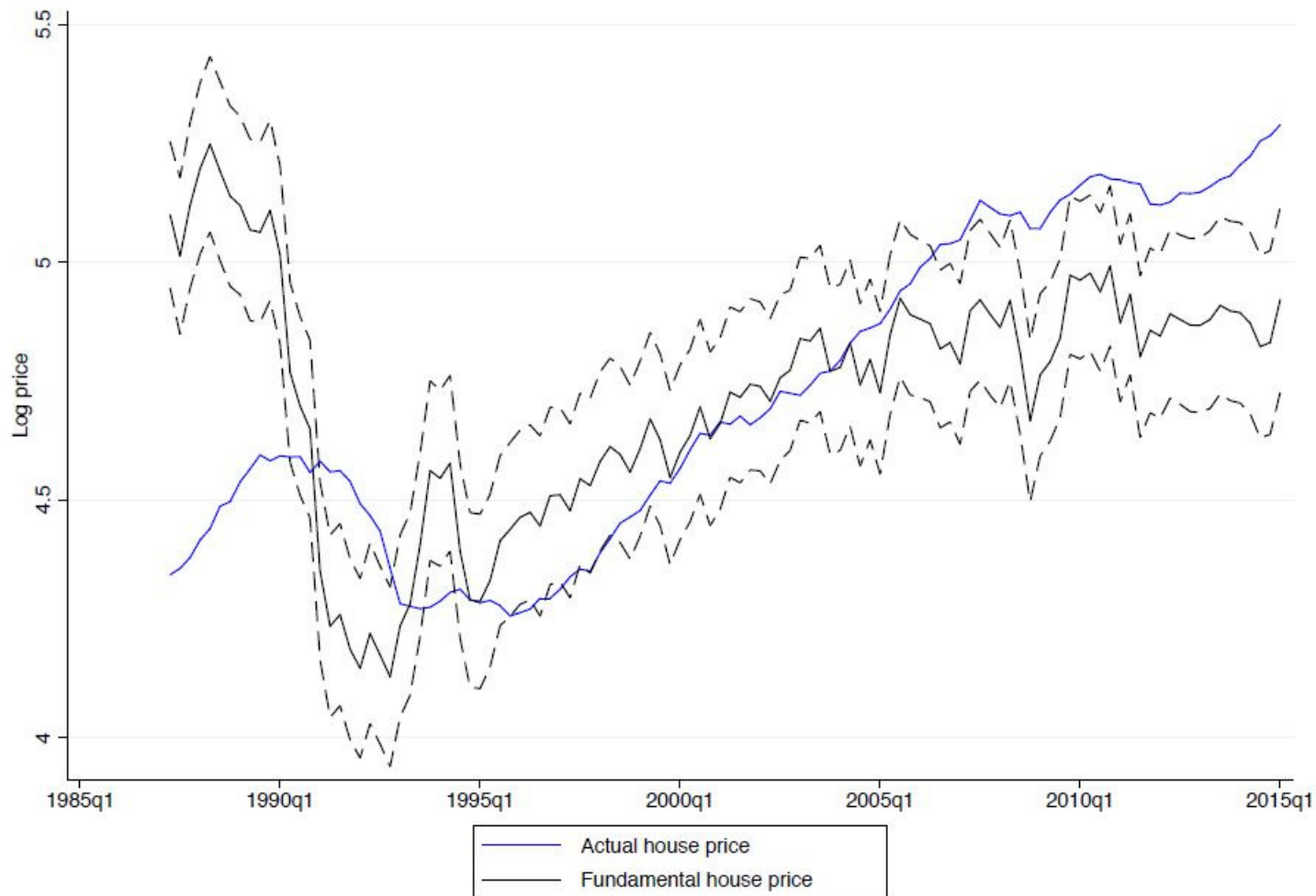
Income elasticity of housing demand = 1.0 Price elasticity of housing demand = -0.5



Note: Dotted lines indicate 90% confidence bands for the fundamental house price.

Actual and estimated fundamental real house prices in Sweden

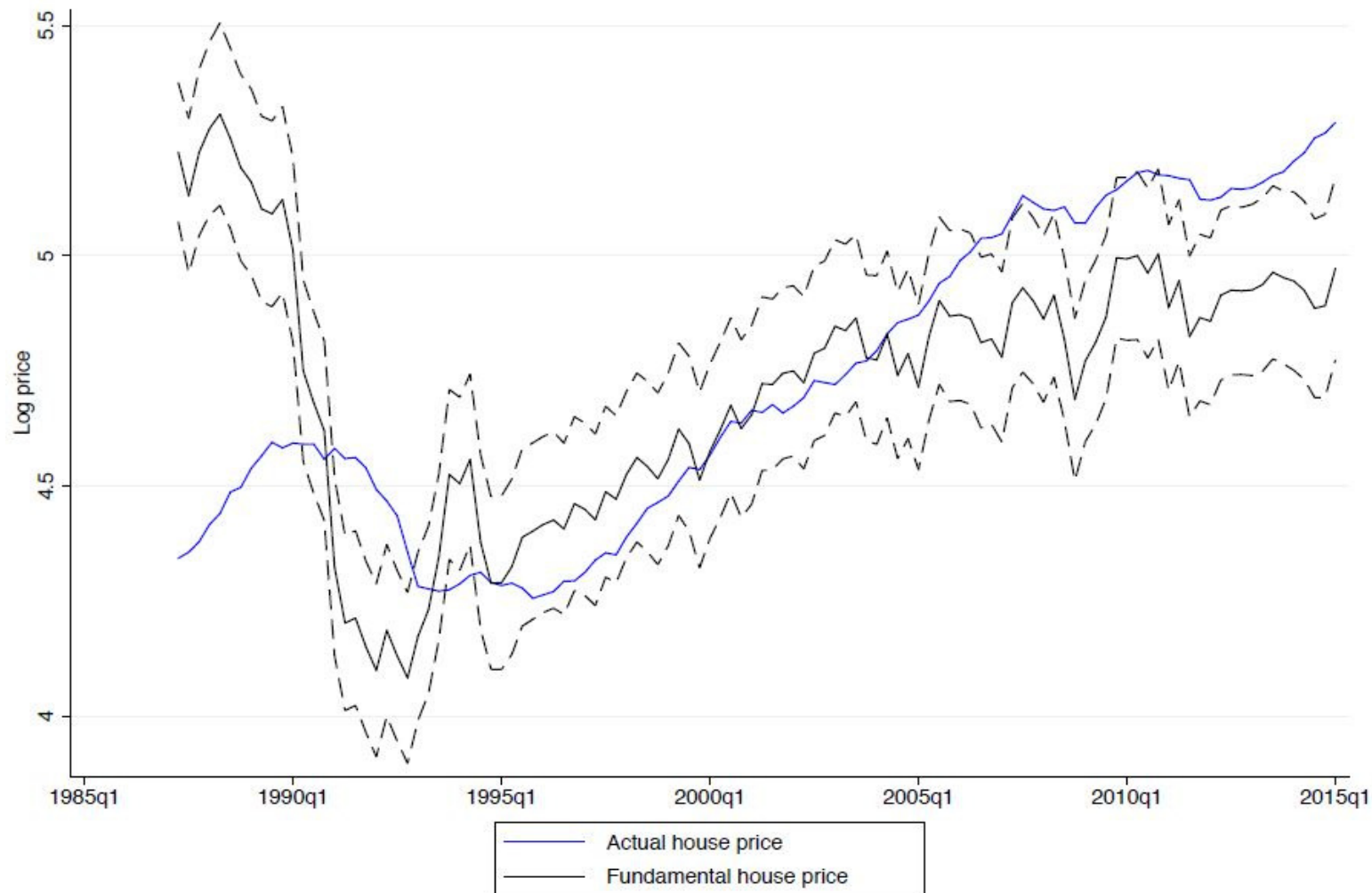
Income elasticity of housing demand = 1.0 Price elasticity of housing demand = -1.0



Note: Dotted lines indicate 90% confidence bands for the fundamental house price.

Actual and estimated fundamental real house prices in Sweden

Income elasticity of housing demand = 1.0 Price elasticity of housing demand = -0.5



Note: Dotted lines indicate 90% confidence bands for the fundamental house price.

The interaction of actual and fundamental house prices

House price dynamics

Hypotheses:

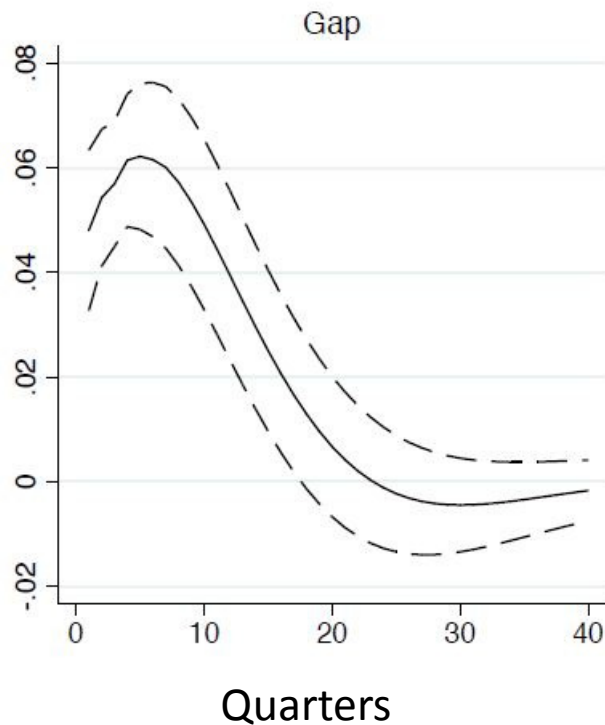
- Actual house prices do not affect fundamental house prices
- Fundamental house prices help to predict actual house prices
- Mean reversion: A positive gap between actual and fundamental house prices causes a future drop in actual prices, and vice versa
- ***Findings:*** For Sweden all hypotheses are accepted by a Vector Error Correction model of the interaction between the actual and the estimated fundamental house prices. For Denmark the hypothesis of mean reversion of house prices is also accepted

Identification of shocks to house prices

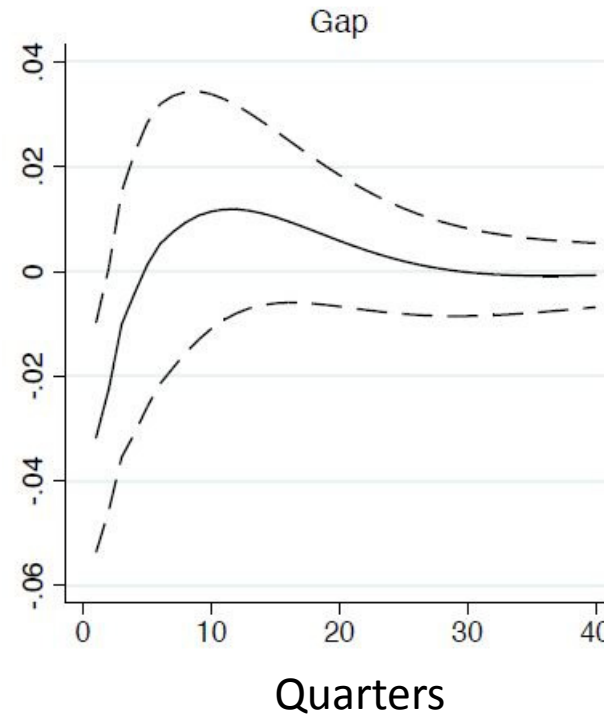
- ***Empirical finding:*** The house price gap between the actual and the fundamental house price is stationary and reverts to a zero mean → actual and fundamental house prices are affected by a common trend shock and by a transitory shock.
- The common trend shock is interpreted as a permanent shock to the fundamental house price.
- Transitory shocks to the VECM are identified by assuming that they have no permanent effect on house prices. They are associated with shocks to actual house prices.

Impulse-responses: How long does it take for the house price gap to adjust to a shock?

Shock to actual house price (DK)



Shock to fundamental house price (DK)



Note: The graphs show the impact of a one-standard deviation shock on the gap between the actual and the fundamental house price. The dotted lines indicate 68 percent confidence bands.

The impact of policy intervention on the housing market

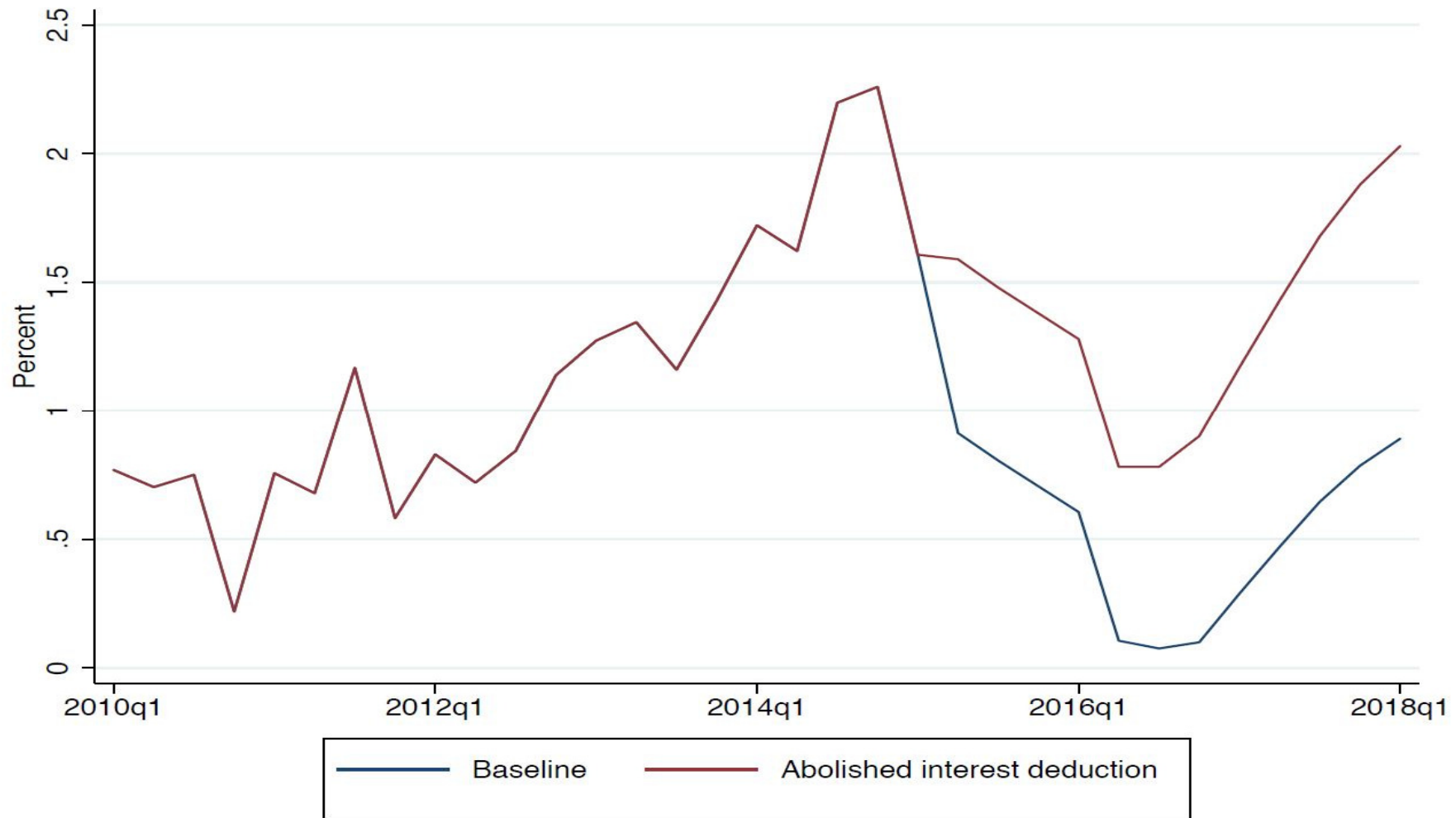
Pricking a house price bubble

Possible interventions to prick a bubble:

- Higher policy interest rate
- Higher property tax
- Abolition of interest deductibility
- Restrictions on loan-to-value ratio

All interventions will tend to increase the user cost of housing

Abolishing interest deductibility: Impact on the user cost in Sweden

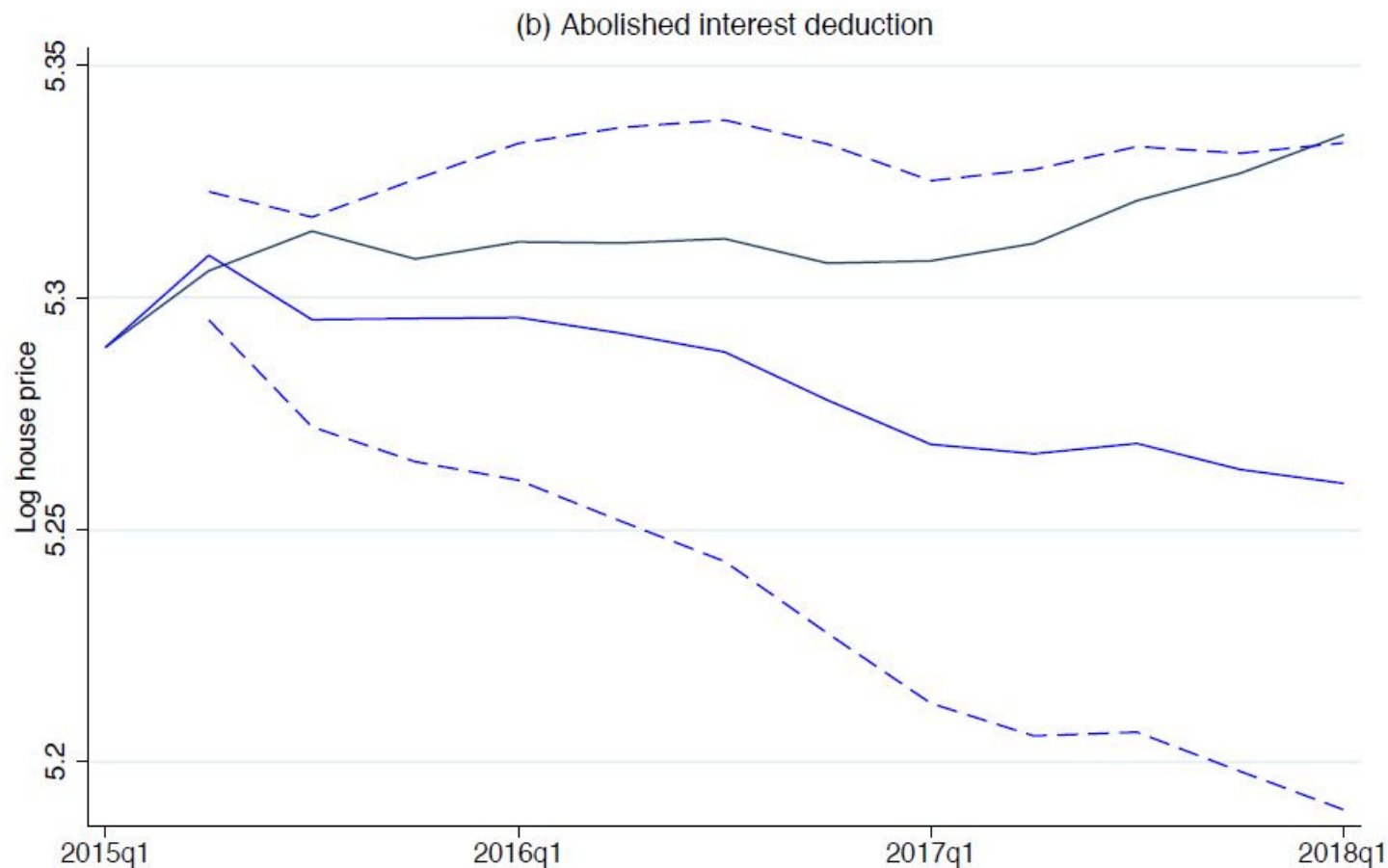


Note: The forecast of the user cost is based on the Riksbank Monetary Policy Report from February 2015.

Simulating the abolition of interest deductibility in Sweden

- The impact on future user cost is estimated from the interest rate forecast in the Riksbank Monetary Policy Report from February 2015
- The evolution of the user cost is taken to be exogenous; the links between user costs and the other variables in the VAR-model are used to calculate the impact on future house prices

The impact on actual real house prices of abolishing interest deductibility in Sweden



Note: The black line shows the expected evolution of the actual house price in the absence of reform; the blue line shows the evolution in case interest deductibility is abolished from 2015:2. The dotted lines indicate the 68 percent confidence band.

Conclusions

- Actual house prices in Denmark and Sweden appear to mean-revert to the estimated fundamental house prices
- The actual house price can deviate from the fundamental level for a considerable period of time
- The Swedish housing market currently seems to be overvalued whereas Danish house prices seem closer to their fundamental level
- A policy reform affecting the user cost of housing can prick a housing bubble, apparently without drastic short-run consequences for the housing market (but mark the word "apparently"!)