THE INTERRELATIONSHIP OF THE MEDIA AND THE U.S. HOUSING BOOM AND BUST

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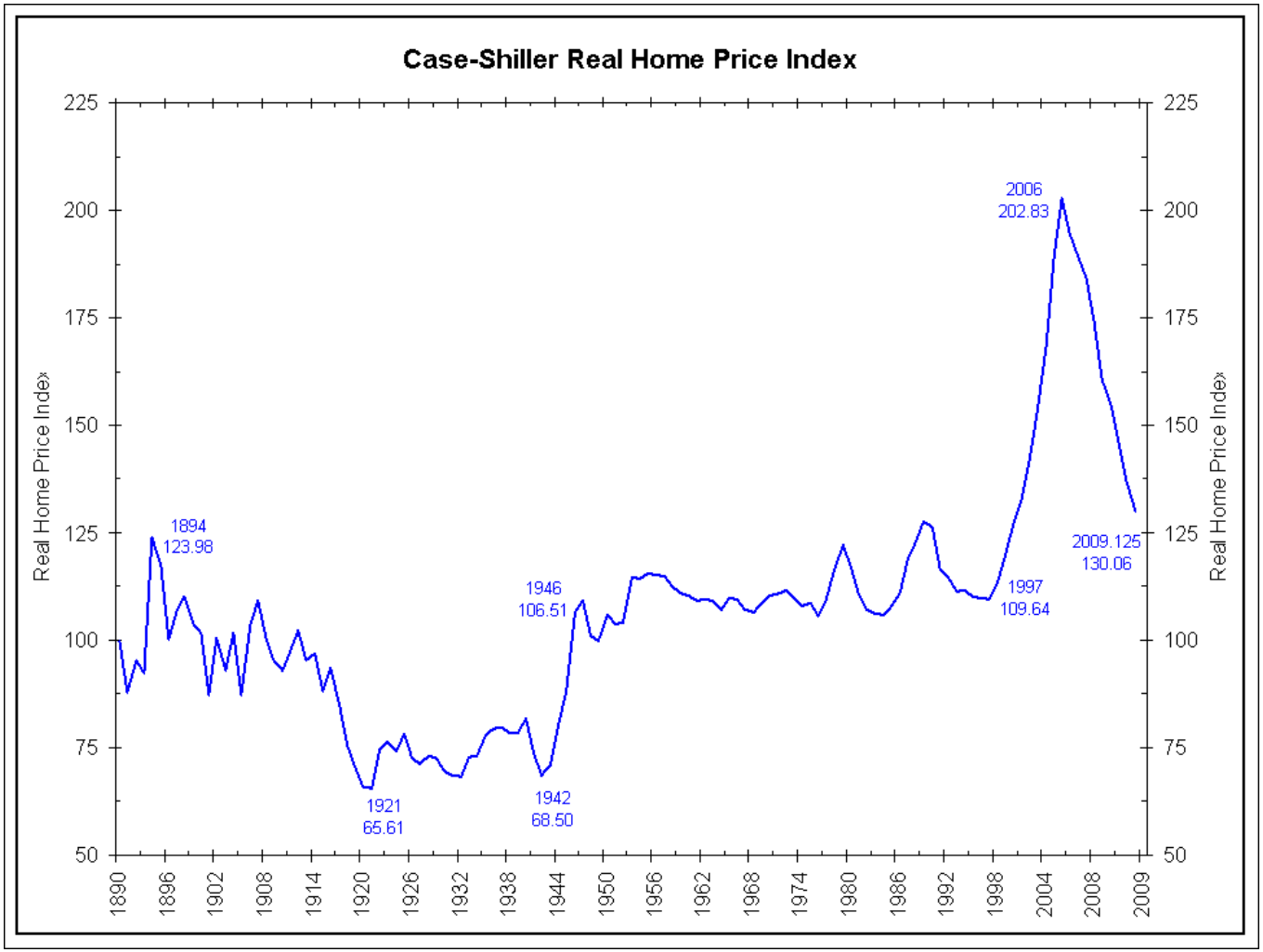
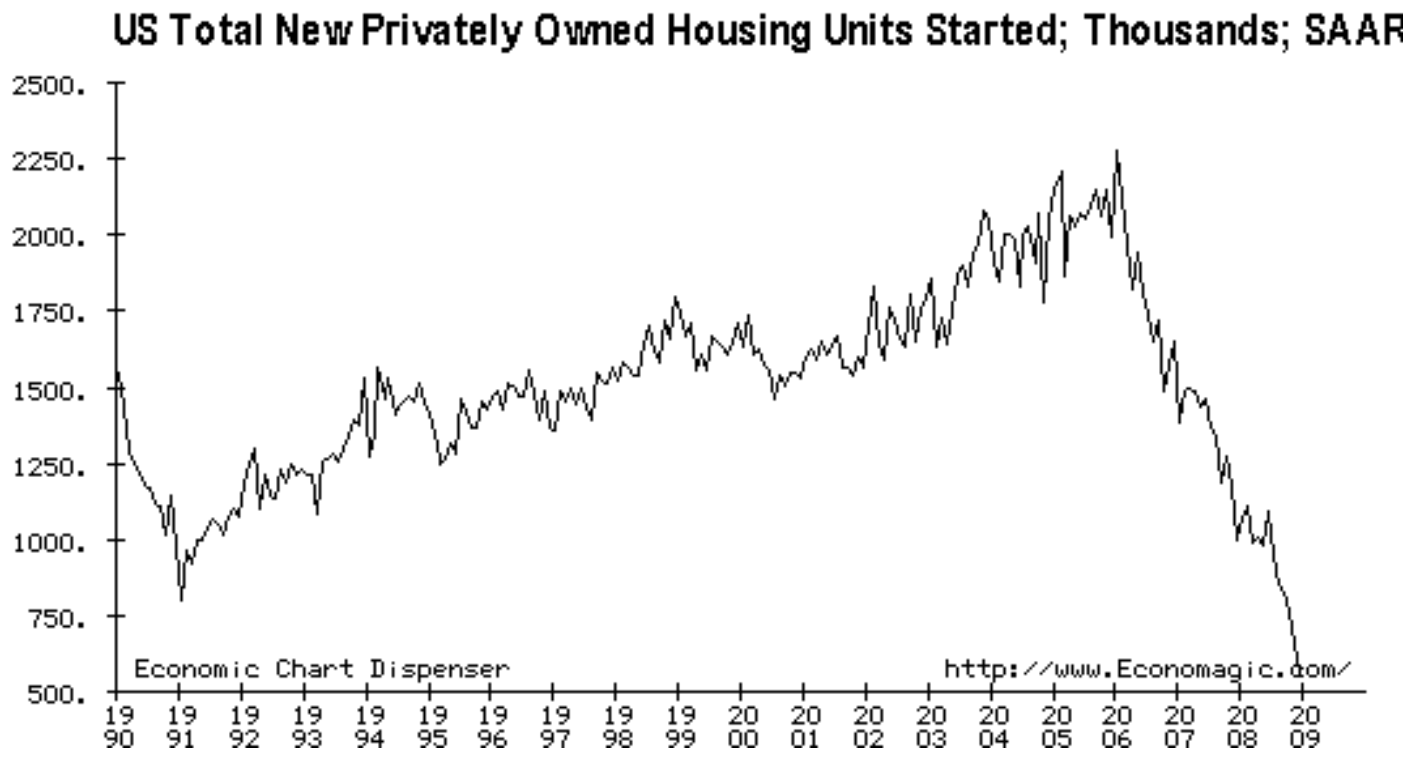
THE U.S. HOUSING BOOM & BUST

- There was an unprecedented boom in the housing market during 1996 to 2006 and an unprecedented bust since 2006/7
- There is general consensus that the bust is simply a correction of the boom
- The boom/bust cycle was very large in the U.S. but not limited to the U.S.
- There are substantial disruptions being caused by the bust. To avoid the boom-bust cycle requires understanding the causes of the boom.
- The cycle occurred in both real house prices and home sales.

VISUAL EVIDENCE FOR A "BUBBLE" IN REAL HOUSE PRICES: 1890-2009



NEW HOME CONSTRUCTION: BOOM AND CRASH: 1990-2009



OVERVIEW OF THE PAPER

- Brief listing of potential causes of the boom and bust
  - Possible role of house price expectations
  - Possible role of the media
- Model and hypotheses
- Literature about media influences
- Granger Causality and VAR estimation results
- Conclude

POTENTIAL CAUSES OF THE HOUSING BOOM-SUPPLY SIDE

- It was not caused by an increase in the cost of producing housing (materials or labor)
- An inelastic supply of housing could have contributed to the price volatility in selected (coastal) MSAs, but not in the majority of areas in the U.S.
- The down payment constraint was relaxed in various ways
- Risk based pricing became prevalent (subprime loans, etc.)
- Mortgage brokers played a role in generating a large flow of mortgages
- Appraisers appear to have systematically overvalued properties
- The secondary market became very active

POTENTIAL CAUSES OF THE HOUSING BOOM-DEMAND SIDE

- The demand for homeownership depends on user cost of owning relative to renting
- Prob own $=f(p_h * UC / p_r)$
- UC= user cost =

$$(r + t_p)(1 - t_y) + d + TC/t^e - \pi^e$$

- Interest rates dropped during 2000-03, but not in 2003-06
- The relative cost of owned housing to the rental cost (p_h/p_r) rose during the boom -- wrong direction of change to explain the boom

CAUSES: CHANGE IN HOUSE PRICE EXPECTATIONS

- The remaining explanatory factor in user costs is the house price expectations term.
- Perhaps it rose dramatically during the housing boom.
- However, there are no good measures of house price expectations for 1996-2006
  - Case-Shiller's 2003 survey during the price boom reported unexplainably high expected house price increases in places such as Milwaukee. I found the same for 2005 survey data for Columbus.

CAUSES: CHANGE IN HOUSE PRICE EXPECTATIONS

- Recent data (2007-2010) from the Survey of Consumers directly measures expected house price changes
  - "By about what percent do you expect prices of homes like yours in your community to go (up/down), on average, over the next 12 months?"
  - Survey results
    - Maximal regional deviation = only 2 percentage points
    - Nominal house prices were expected to fall only modestly

HOUSE PRICE EXPECTATIONS, BY REGION: 2007:4 -2009:3

THEY ARE TOO HIGH AND TOO SPATIALLY UNIFORM

COMPARISON OF EXPECTED AND ACTUAL HOUSE PRICE CHANGES

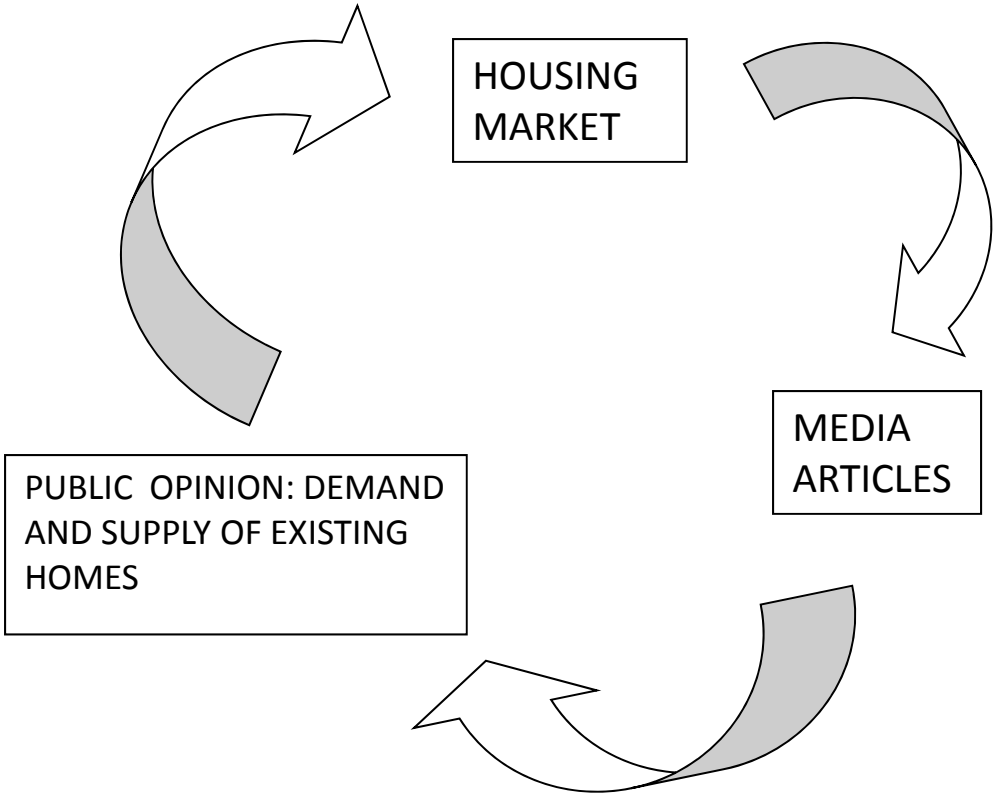
- The survey's reported expectations are too optimistic and there is too little regional variation
- Data from Freddie Mac (annual growth rate)

YYYYQQ	New England	Middle Atlantic	South Atlantic	East South Central	West South Central	West North Central	East North Central	Mountain	Pacific	The United States
200701	-2.04	3.14	2.61	5.30	5.90	2.32	-0.16	6.21	4.90	3.11
200702	-1.20	3.04	2.75	4.93	5.48	1.77	-0.49	5.19	3.29	2.62
200703	-1.30	2.14	1.86	3.53	4.80	0.70	-1.66	3.81	0.44	1.26
200704	-2.21	1.61	-1.18	1.99	3.08	-0.35	-2.98	-1.14	-4.41	-1.26
200801	-3.87	-0.22	-4.59	0.17	1.53	-2.64	-4.24	-3.74	-12.80	-4.73
200802	-5.47	-1.96	-5.81	-0.42	1.32	-2.54	-4.14	-5.94	-16.54	-6.16
200803	-5.49	-1.63	-7.22	-1.54	0.69	-2.69	-4.20	-7.82	-19.91	-7.31
200804	-6.22	-3.68	-11.41	-2.80	-0.31	-3.62	-5.94	-9.76	-22.75	-9.52
200901	-3.72	-4.08	-9.60	-2.80	-0.15	-3.07	-4.82	-12.10	-21.18	-8.57
200902	-2.79	-3.51	-7.79	-2.64	0.16	-2.03	-3.98	-10.78	-15.47	-6.59
200903	-2.54	-2.67	-5.12	-1.26	0.00	-1.33	-2.79	-9.39	-7.17	-3.98
200904	-0.11	-0.07	-1.84	0.85	1.53	1.06	-0.94	-7.01	1.65	-0.43

WHY ARE HOUSEHOLDS' HOUSE PRICE EXPECTATIONS "INACCURATE"?

- Robert Shiller (2005) noted that "the history of speculative bubbles begins roughly with the advent of newspapers". He also argued that the media amplify the attention paid to housing prices during a boom by creating a "price change-news story-price change" feedback loop.
- The idea behind our hypothesis is that the national media influences the formation of local house price expectations.
- Our goal is to test this hypothesis as best as possible.
  - To do so we have to relate measures of media coverage of the boom and bust to observable measures of housing demand and supply.

ONE VERSION OF THE MODEL



THE MEDIA AND THE ECONOMY

- There is a substantial literature relating the economy, media coverage, and public opinion
  - In general the studies' findings are mixed. Sometimes the media influences public opinion (holding constant the actual events), sometimes not.
  - There is a reasonable amount of evidence that the media coverage of negative news is greater than that of positive news and that negative news is more influential on public opinion than positive news.

DATA: CONTENT ANALYSIS OF THE NEWS MEDIA

- Using Lexis-Nexis, we identified 1,665 articles about the U.S. housing market in *USA Today* between January 1996 and October 2008
- We measured the overall tone of the article and each article was coded for the presence (1) or absence (0) of mentions of high home values, low home values, high home sales, and low home sales. The data are monthly.

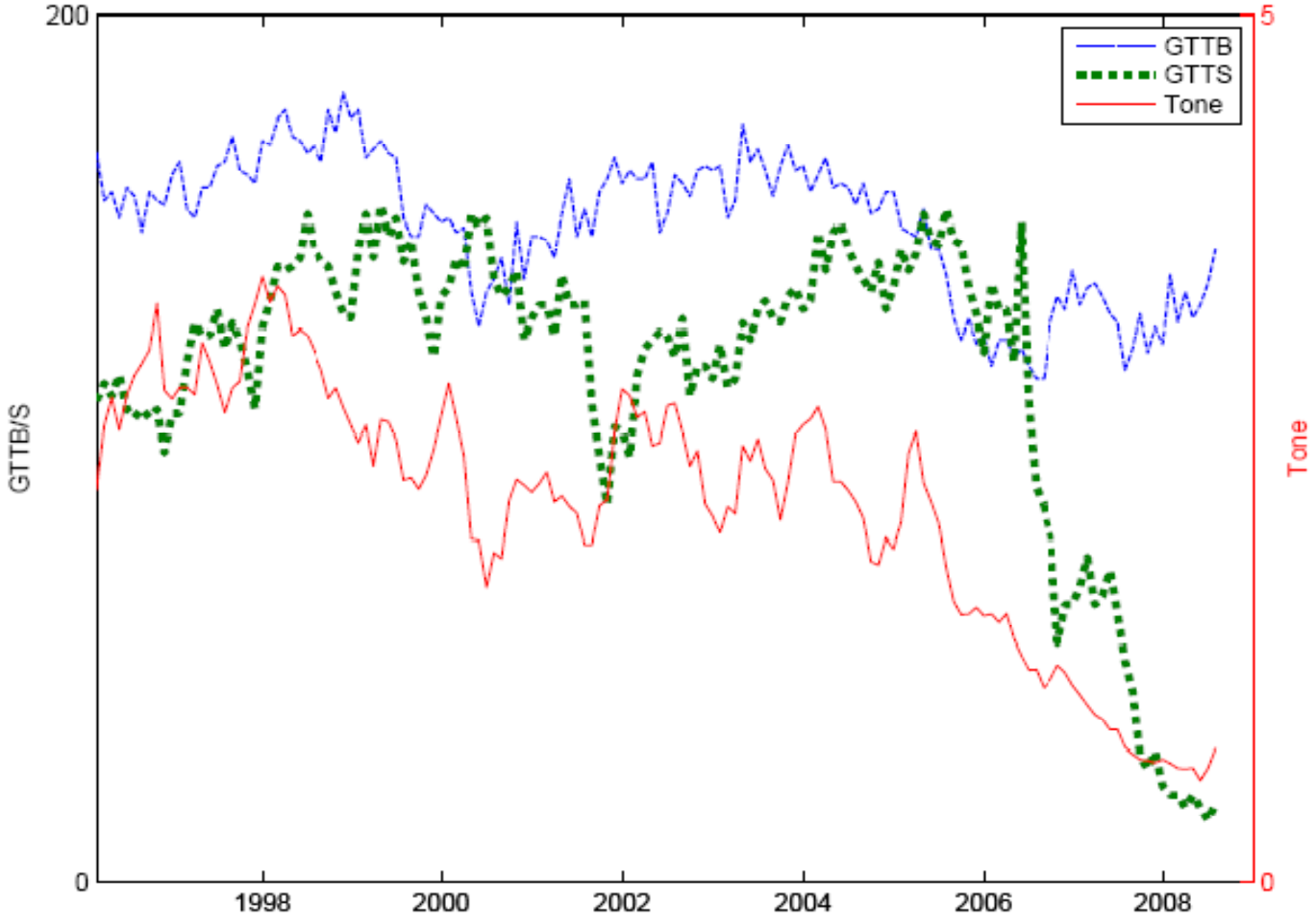
DATA: MEASURES OF DEMAND AND SUPPLY OF HOUSING (PUBLIC OPINION)

- We used two measures of consumer sentiment about the housing market, derived from the Survey of Consumers (Reuters/University of Michigan, 2010).
  - "Generally speaking, do you think now is a good time or a bad time to buy a house?" (GTTB)
  - "Do you think now is a good time or a bad time to sell a house?" (GTTS, limited to current owners)
  - The measures vary from 0 to 200 and vary monthly.
  - In both cases reasons for the answers were given

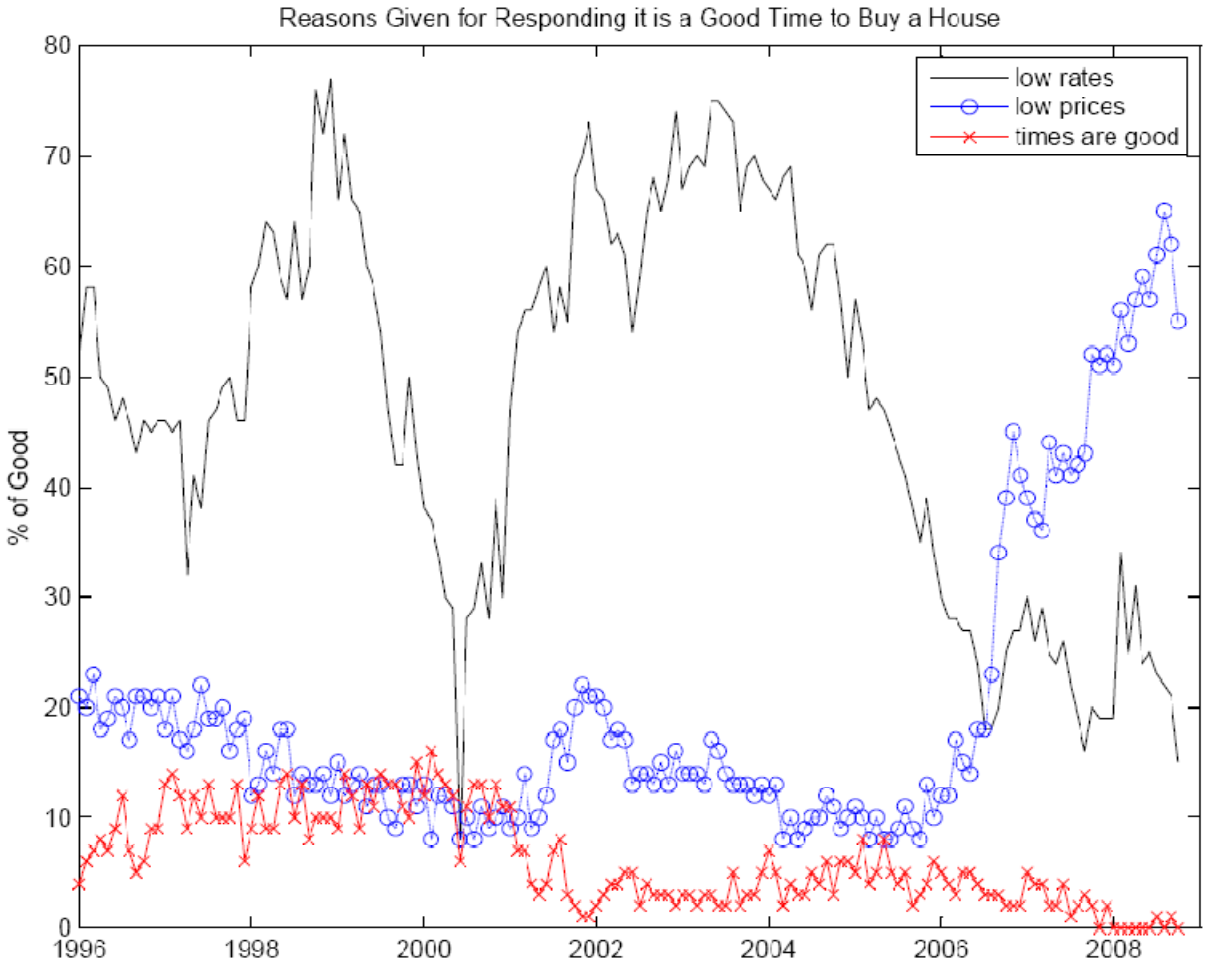
THE MODEL OF FACTORS AFFECTING GTTS AND GTTB

- For GTTS (the supply of existing homes) we expect variables that increase GTTS will include
  - House prices being high or rising
  - The volume of sales being high or rising (which implies a shorter marketing time)
  - Media articles indicating the above
- For GTTB (the demand for homes) we expect variables that affect GTTB will include
  - Mortgage interest rate levels, house price levels, housing being viewed as a good investment (house prices will increase), and the economy's strength
  - Media articles about the above

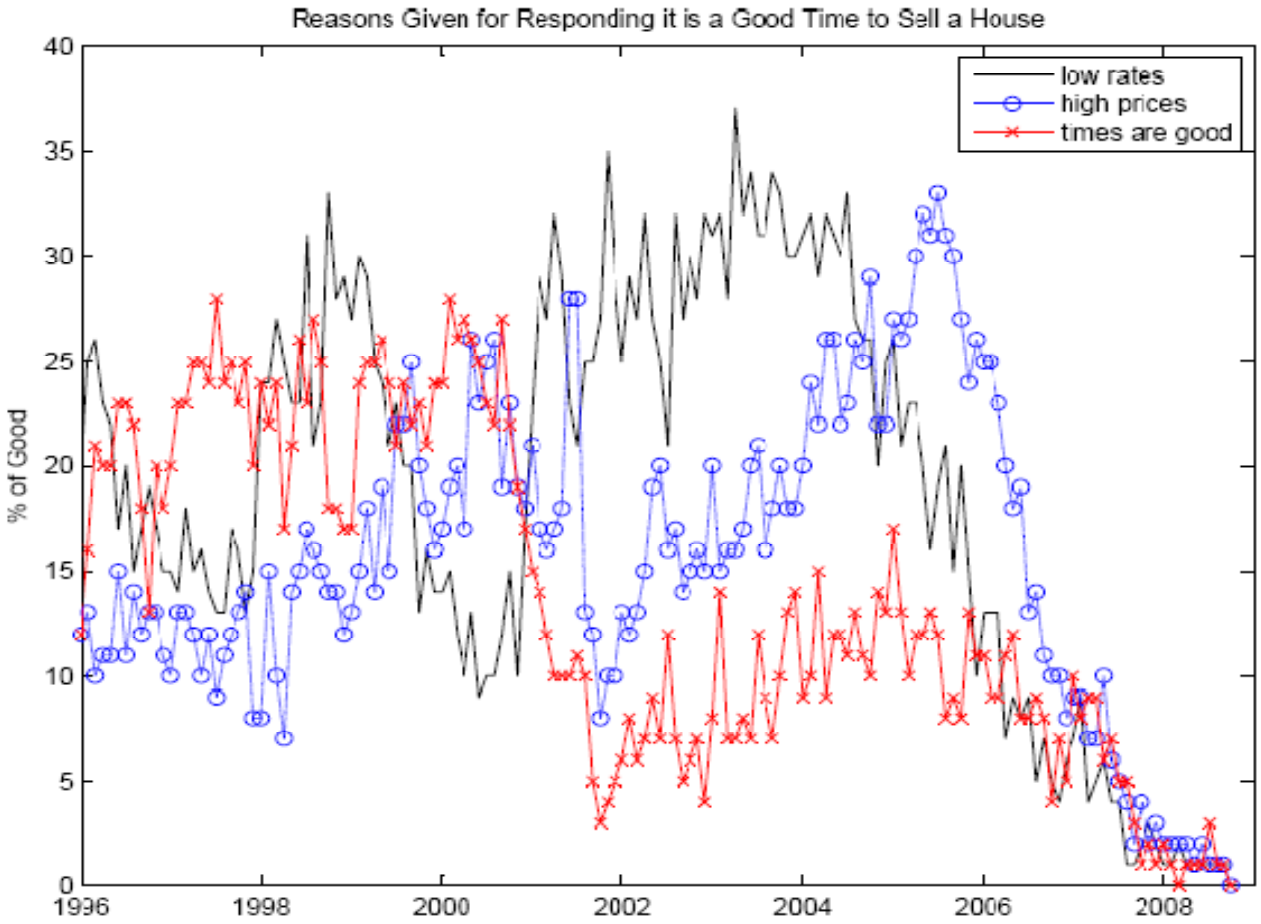
THE VALUES OF HOUSING ARTICLES' TONE, GOOD TIME TO BUY, AND GOOD TIME TO SELL



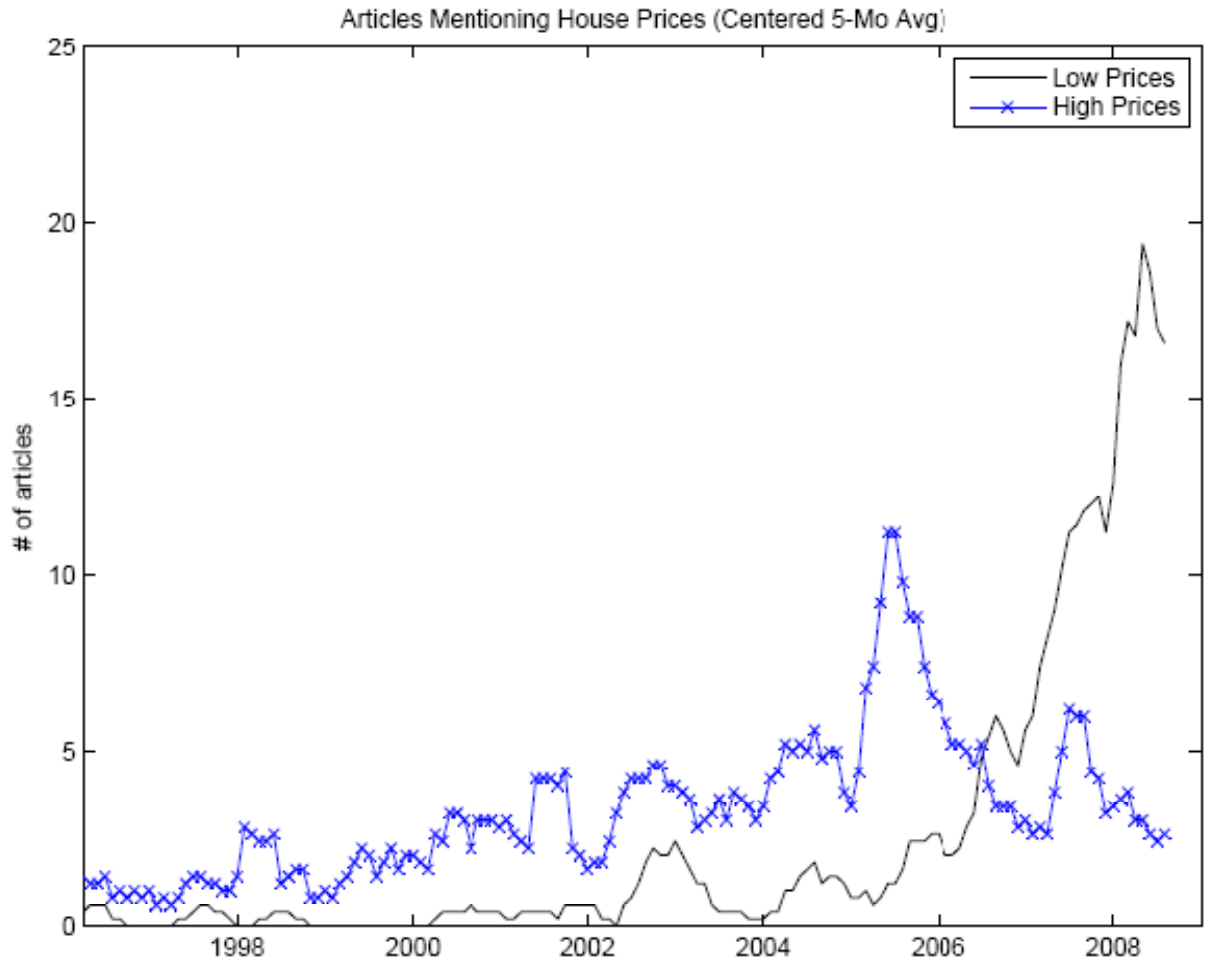
REASONS FOR INDICATING IT IS A GOOD TIME TO BUY



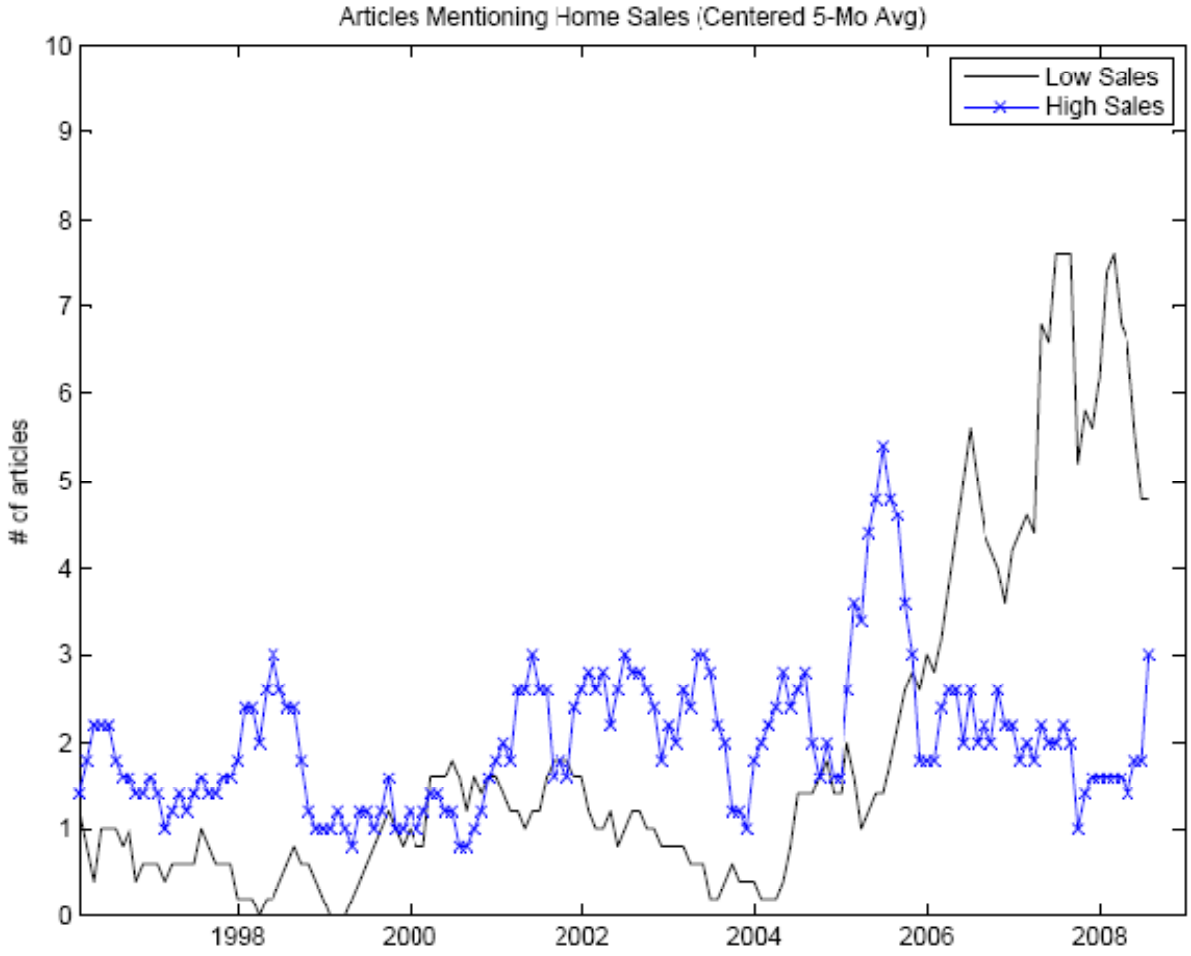
REASONS FOR INDICATING IT IS A GOOD TIME TO SELL



MEDIA: ARTICLES ABOUT HIGH AND LOW HOUSE PRICES



MEDIA: ARTICLES ABOUT HIGH AND LOW HOUSE SALES



ECONOMETRIC MODELS

- We use both a Granger causality model and a vector autoregressive model (VAR)
- The set of endogenous variables is dictated by data availability and theoretical considerations
- In the VAR model, all variables are allowed to affect each other, with some structure imposed about the temporal order of influence. Deciphering the results is typically done through impulse response functions (IFR).
  - In a IRF, a variable is "shocked"(e.g. by 1 s.d.) for one period and the evolution of itself and other variables is measured. There can be no/little effect, or positive and negative effects. These effects can be transitory or persist over time (months)

VARIABLES

- We redefine the media variables to be
  - Media price = media high price - media low price
  - Media sales = media high sales - media low sales
  - Tone of the articles (5=positive, 1=negative)
  - The unit of the measure is articles/month
- Economy
  - Mortgage interest rate and change in real income
- Housing Market
  - Case-Shiller real house price index
  - Sales of existing and new houses
- Public Opinion about the Housing Market
  - GTTB
  - GTTS
- Periodicity = monthly data
- Lags structure: used AIC to identify that up to 2 period lags were optimal. (Seems reasonable)

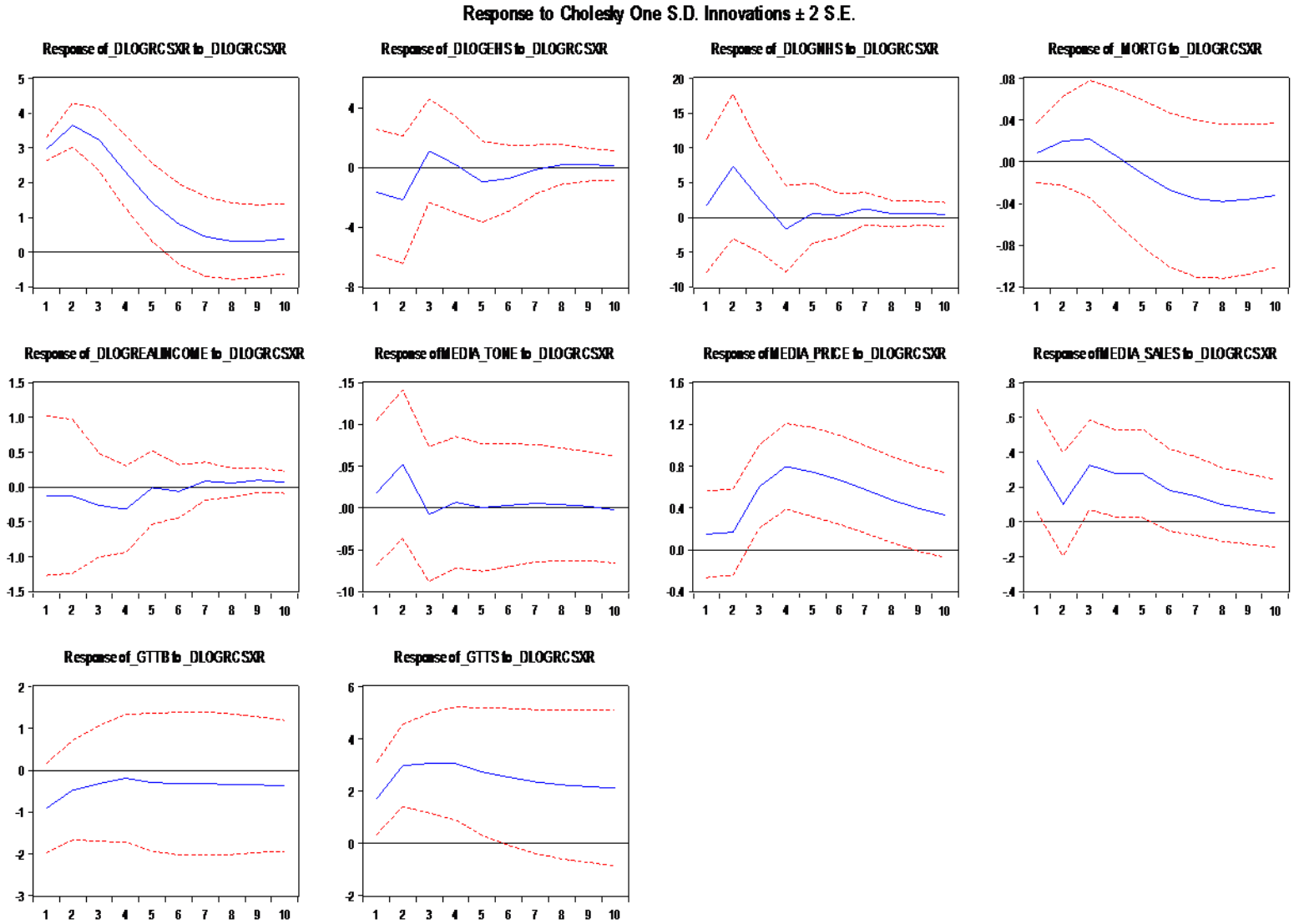
GRANGER MODEL RESULTS

Ho: Row variable does not		Pairwise Granger Causality Tests								
Granger cause column varb	EHS	NHS	CSHPI	Real Income	Mortgage Rate	Media Tone	Media Sales	Media Prices	GTTB	GTTS
EHS		0.06	0.14	0.82	0.27	0.09	0.00	0.82	0.12	0.31
NHS	0.00		0.04	0.13	0.10	0.00	0.06	0.00	0.51	0.50
CSHPI	0.18	0.00		0.84	0.33	0.25	0.02	0.00	0.95	0.00
Real Income	0.64	0.52	0.76		0.58	0.02	0.89	0.34	0.41	0.59
Mortgage Rate	0.00	0.00	0.43	0.18		0.06	0.29	0.85	0.32	0.65
Media Tone	0.01	0.00	0.00	0.46	0.31		0.00	0.00	0.26	0.00
Media Sales	0.05	0.00	0.05	0.20	0.55	0.05		0.00	0.88	0.00
Media Prices	0.13	0.01	0.00	0.35	0.81	0.02	0.39			0.49
GTTB	0.00	0.00	0.00	0.89	0.54	0.00	0.00	0.17	0.84	0.00
GTTS	0.06	0.00	0.00	0.34	0.44	0.21	0.04	0.00	0.79	
Numbers shown are the p-values from F-tests with the restriction that coefficients on the row variable are zero.										
Regressions were of the column variable on two lags of itself and two lags of the row variable										

GRANGER MODEL RESULTS

- Pairwise Granger tests of the basic cyclic causality model suggest statistically significant effects for:
  - The various media articles reflecting what is happening in the housing market (prices and sales cause media articles about prices and sales)
  - For the media affecting GTTS (but not GTTB)
  - For GTTS and GTTB affecting housing market outcomes (prices, existing and new home sales).
- Tests of other links in the model indicate significant effects for:
  - Prices cause GTTS (not GTTB)
  - GTTS and GTTB cause media tone, price, and sales
  - The media causes changes in observed home sales and prices (“media frenzy”)

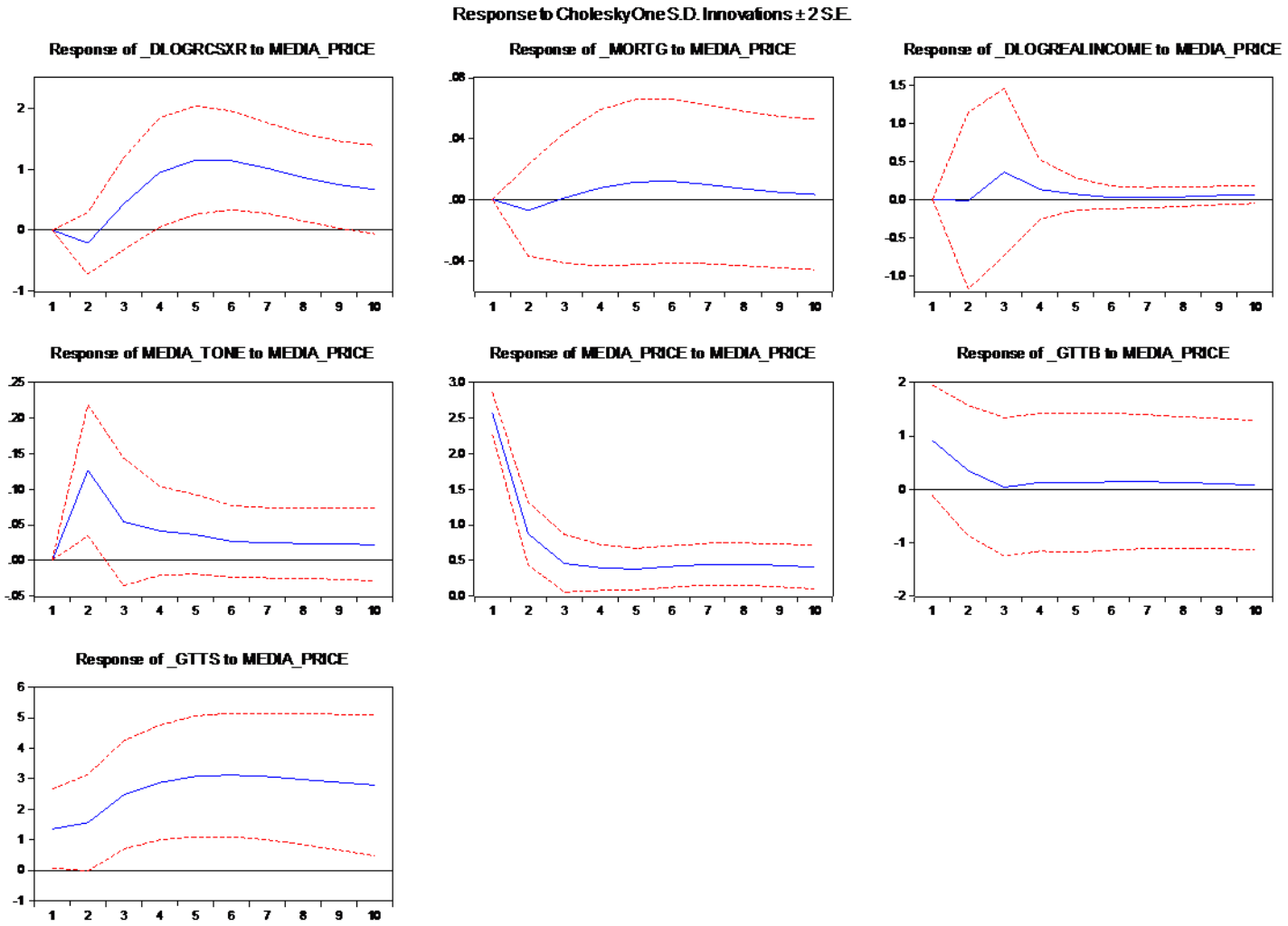
VAR MODEL IMPULSE RESPONSE FUNCTIONS: RESPONSES TO A HOUSE PRICE INCREASE OF 1 S.D.



RESPONSES TO INCREASE IN OBSERVED HOUSING PRICE

- Note the 95% confidence intervals are displayed.
- Results:
  - The increase in house prices persists for about 5 months
  - Media stories about high prices increase with a month's lag by 0.5 to 0.8 articles
  - The tone of media stories was unaffected
  - A direct effect on GTTS, which rises by 3 points
  - No effect on GTTB
  - As expected, no effect on interest rates or income

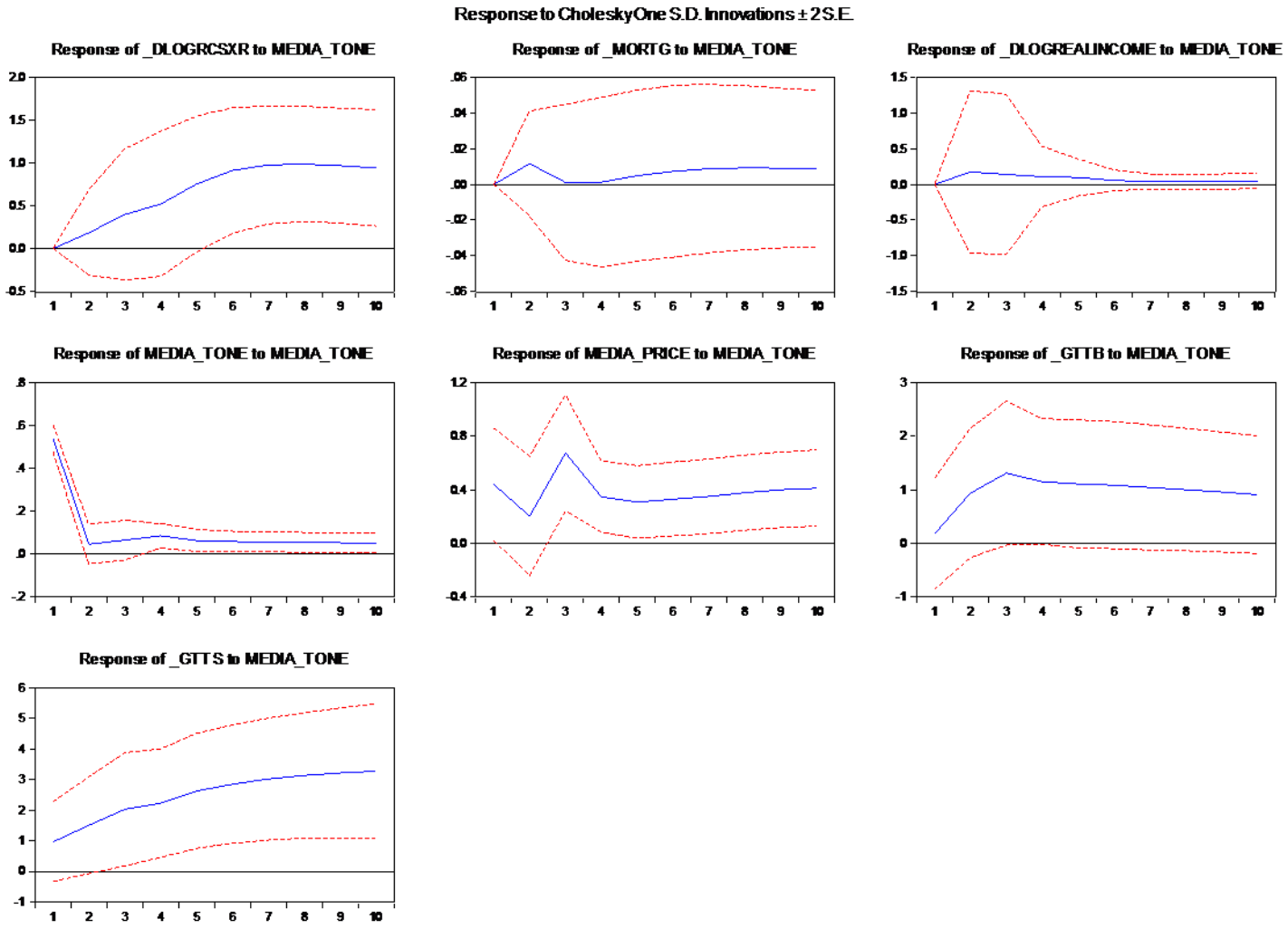
RESPONSES TO A SHOCK TO MEDIA REPORTING OF HIGH PRICES BY 1 S.D.



RESPONSES TO A SHOCK TO MEDIA STORIES ABOUT HOUSE PRICES

- The “own” effect persists only for a couple of months
- Media stories on high prices increase GTTS by about 2 points, but GTTB is not affected
- There is a feedback effect whereby media stories about high house prices increase house prices

RESPONSES TO A SHOCK TO MEDIA TONE BY 1 S.D



RESPONSES TO A SHOCK TO MEDIA TONE BY 1 S.D

- GTTB increases
- GTTS increases
- House prices increase

THE EFFECTS OF INCREASING GTTB AND GTTS (PUBLIC OPINION)

- Increasing GTTB leads to
  - Media tone increases
  - house prices increase
  - GTTS increases
- Increasing GTTS leads to
  - house prices increase
  - More media stories on house prices increasing
- These results complete the Shiller argument of a complete feedback mechanism

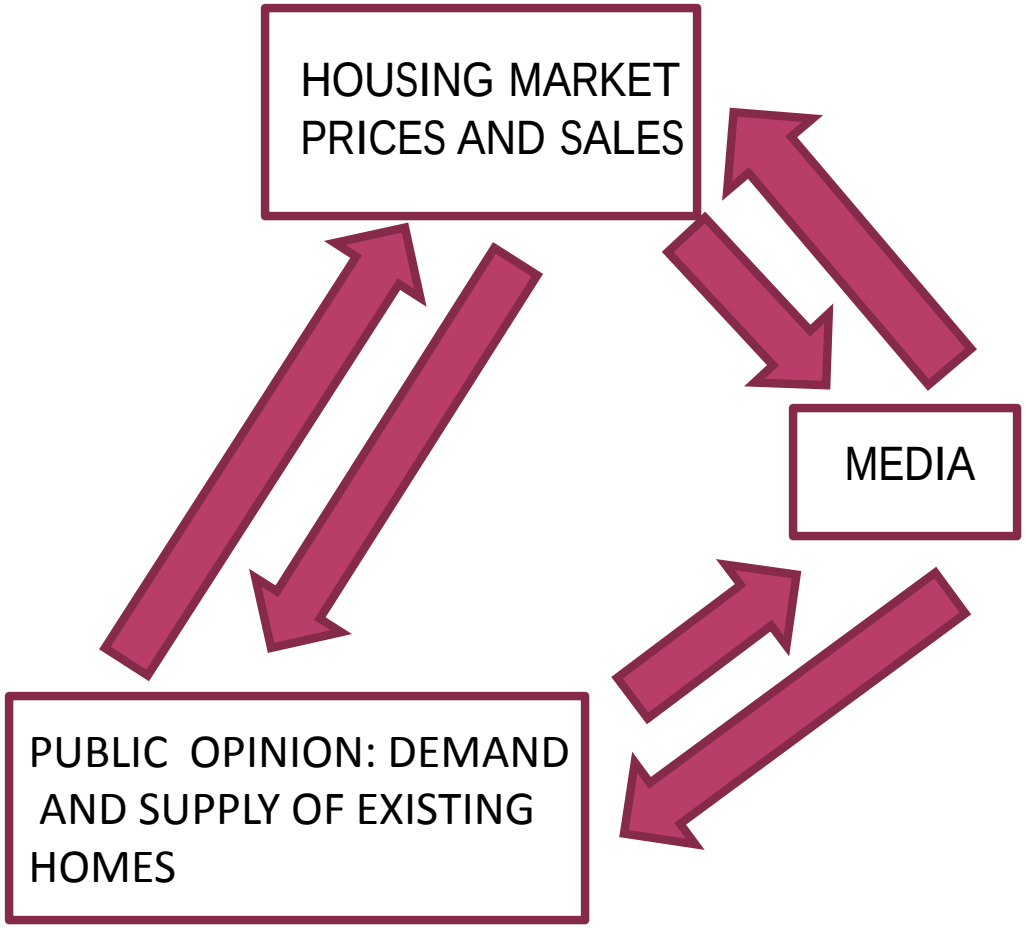
RESPONSES TO A SHOCK TO NEW HOME SALES

- A persistent “own” effect for at least 10 months
- Increases in
  - Existing home sales
  - Media tone
  - Media stories about sales rising
  - GTTB
  - GTTS

RESPONSES TO A SHOCK TO MEDIA STORIES ABOUT HIGH OR RISING HOME SALES

- New home sales rise (bandwagon type of effect) by 1% for at least 10 months
- Media stories persist for 2-3 months
- GTTS rises for at least 10 months
- There are similar effects for a shock to media tone (and GTTB rises)
- Also we find shocks to GTTB and GTTS positively affect new home sales

REVISED MODEL



CONCLUSIONS

- A variety of factors contributed to the housing boom and subsequent bust.
- Arguably, the increase in the demand for homeownership spurred the increase in house prices. The boom in sales was caused by both an increase in the demand and in the supply of existing houses.
- We investigate Shiller's hypothesis that the media played a role in increasing housing demand. An extension is to test the media effect on housing supply.
- We create measures of the amount and content of newspaper articles. We identify measures of public opinion about whether it is a good time to buy a house and sell a house.
- There is evidence from a Granger and a VAR model that the amount and content of newspaper stories had a role in the housing boom and bust.