



JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

# Housing, Economics and People in the U.S. and Wisconsin

**Morris A. Davis, Ph. D.**

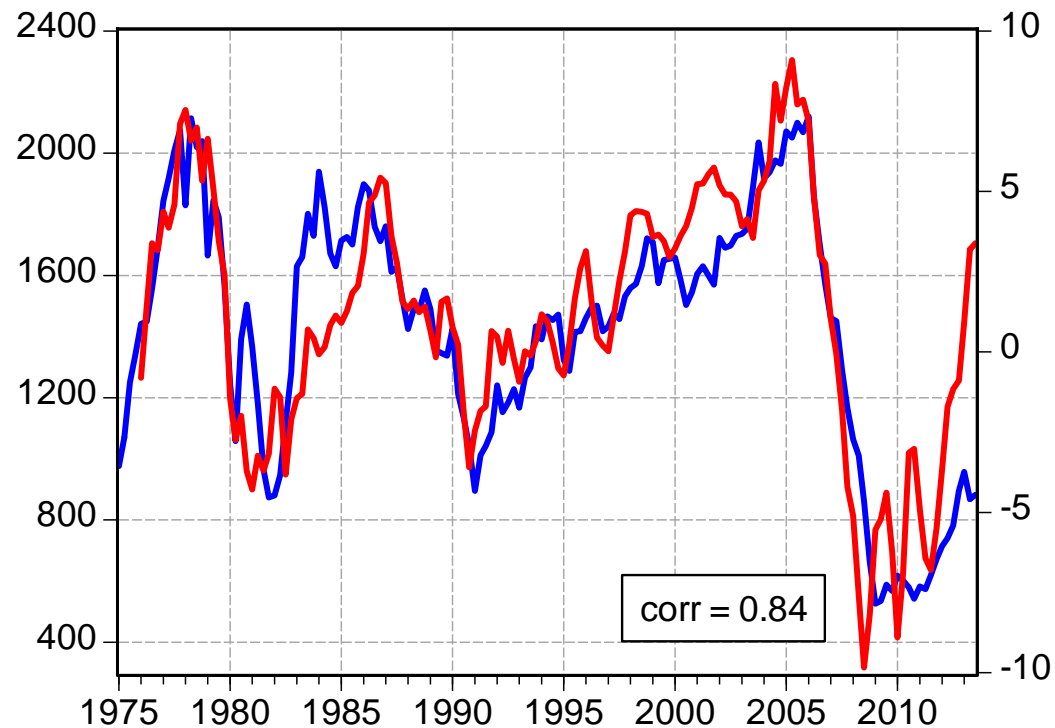
Academic Director, James A. Graaskamp Center for Real Estate  
Associate Professor, Department of Real Estate and Urban Land Economics

Wisconsin School of Business, University of Wisconsin-Madison

**February, 2014**



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE



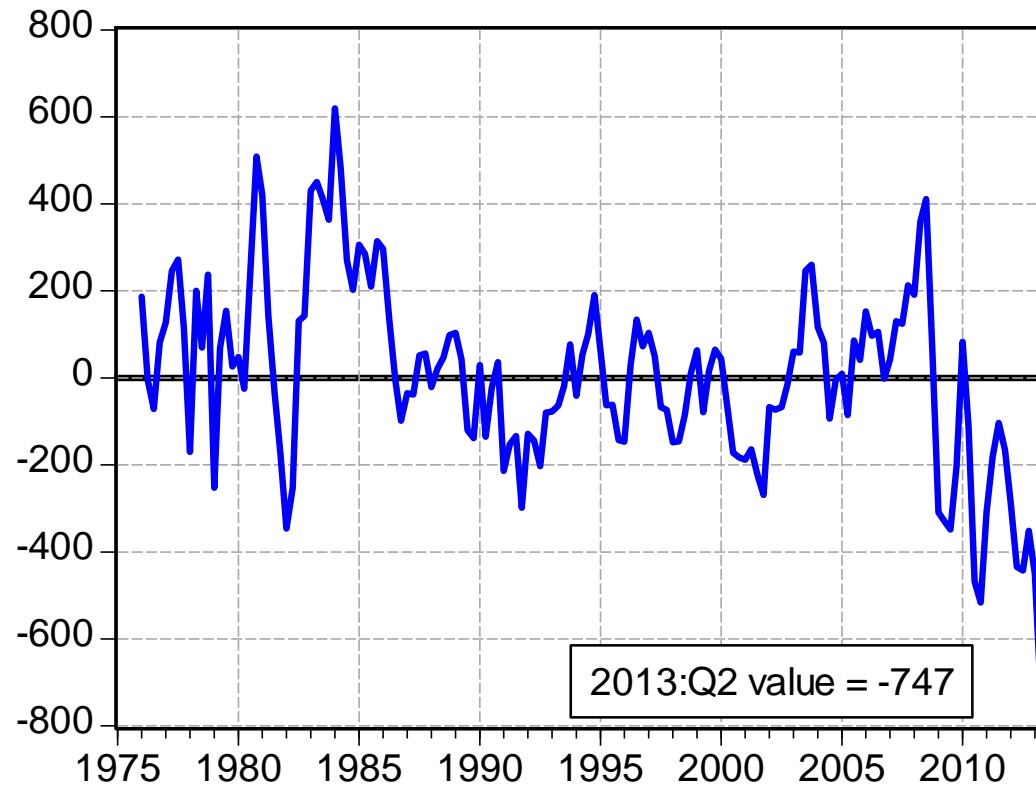
— New Starts in 000s (left)  
— Y/Y Growth Rate, Real House Prices (right)

$$\text{New Starts (000s)} = 1328 + 89 * \text{Y/Y Growth in House Prices}$$
$$R^2 = 0.71$$



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Error from Regression



Starts are lower than predicted by **747K** units.  
Starts in 2013:Q3 are **882K**, predicted is **1.6M**.

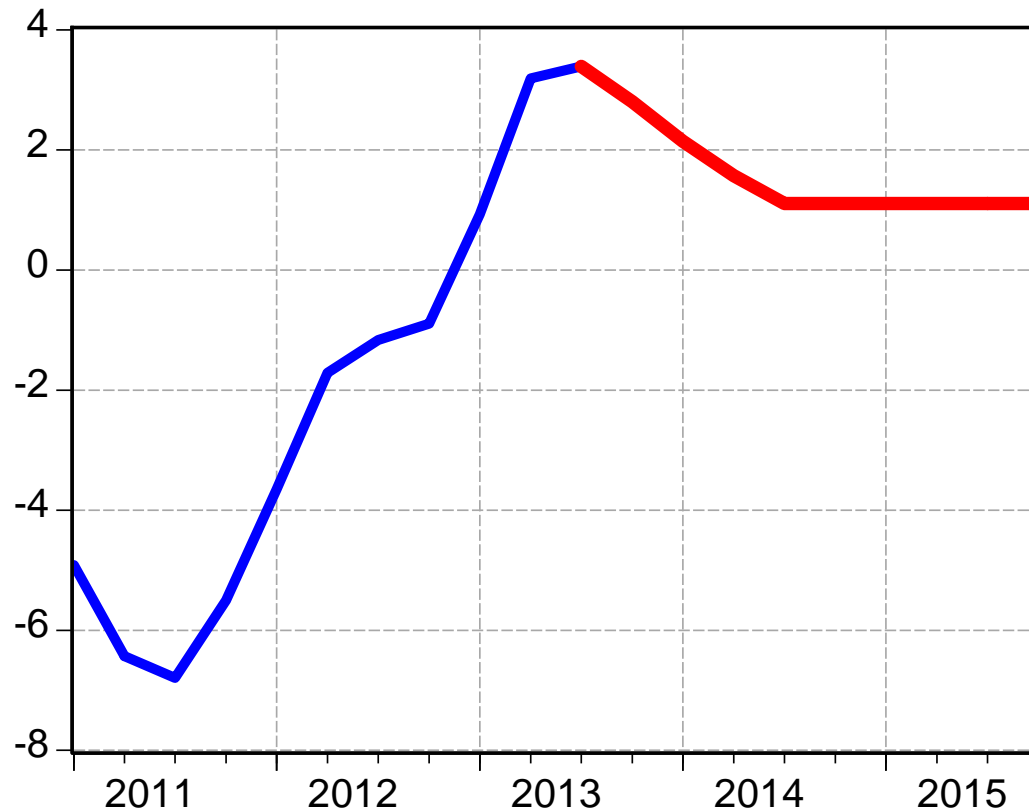


- According to model, starts too low by 747K
- **How did past gaps like this close?**
- Statistical evidence
  - Starts and house prices correct the gap
    - Starts may be too low
    - But house prices may be too high



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Real House Price Growth

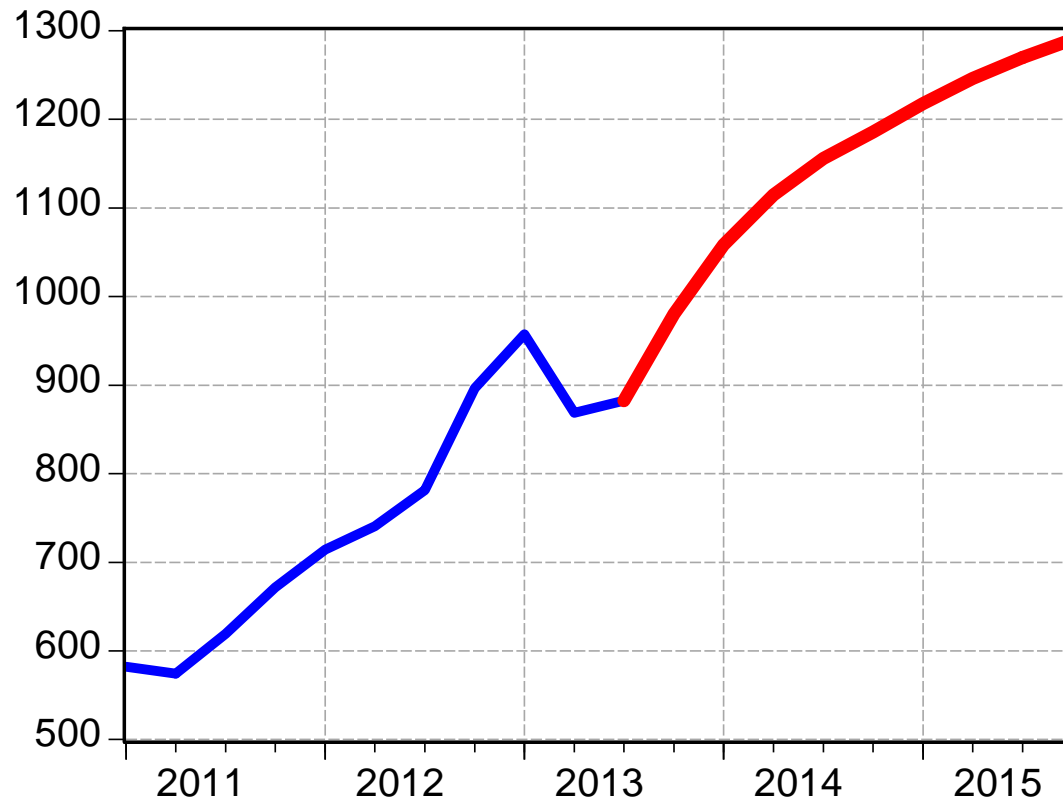


Even if house price growth tapers



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Housing Starts



Forecast 1.2 million starts by end of 2014



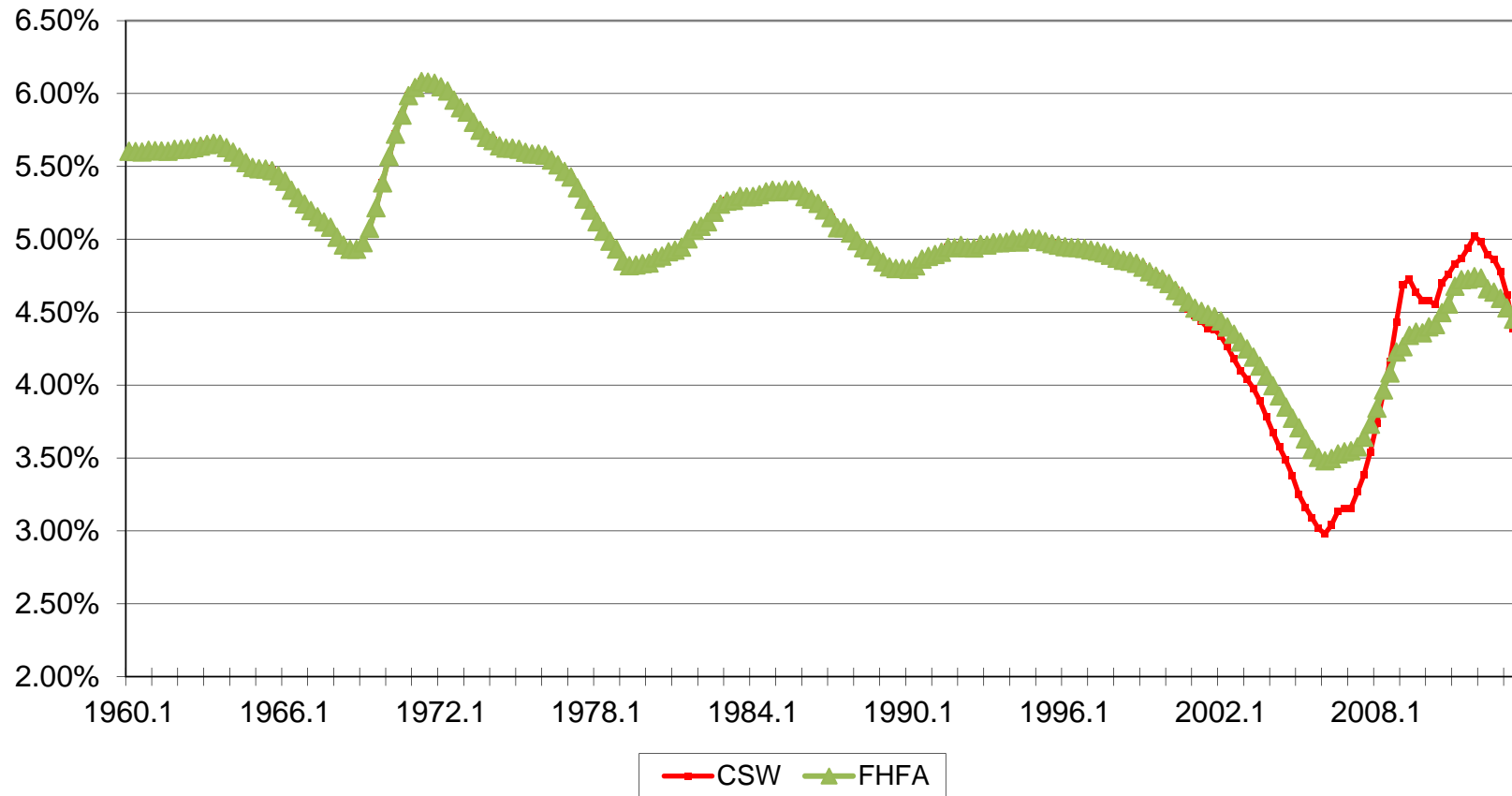
## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Why would we expect continued strength to house prices?



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Gross Rent-Price Ratio, U.S. Stock of Owner-Occupied Housing



Housing fairly valued. Prices and rents to incr. at same rate

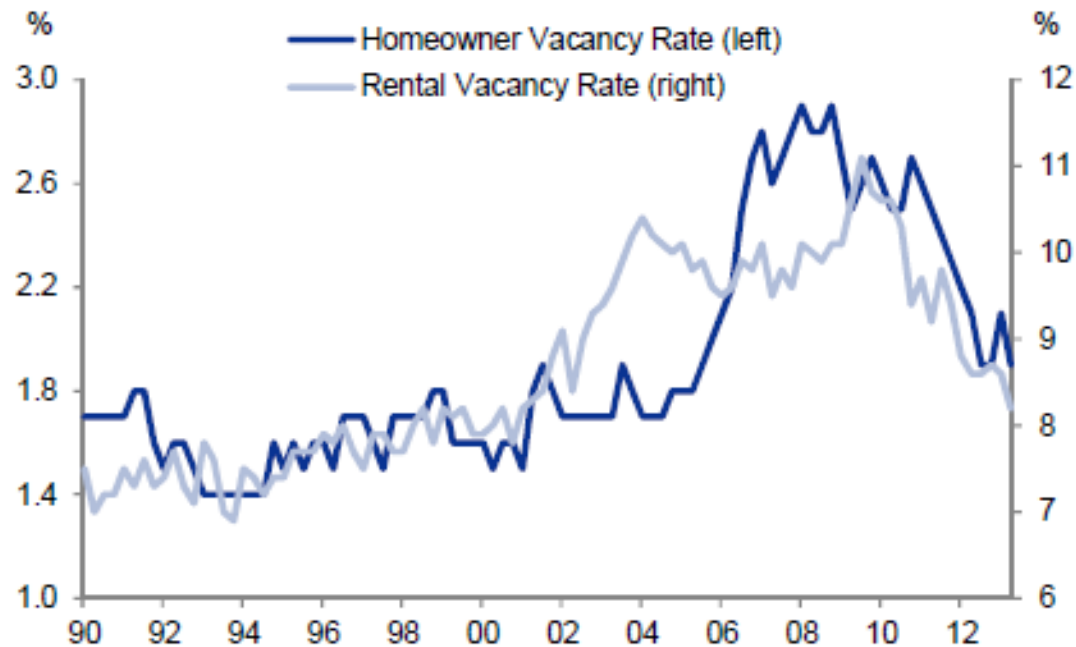




# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## Exhibit 44: Homeowner and rental vacancy rates

Both homeowner and rental vacancy rates declined in Q2



Source: Census Bureau.

Taken from 10-4-2013 Goldman Sachs US Housing Monitor

Vacancy rates may be low given we are exiting a recession



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

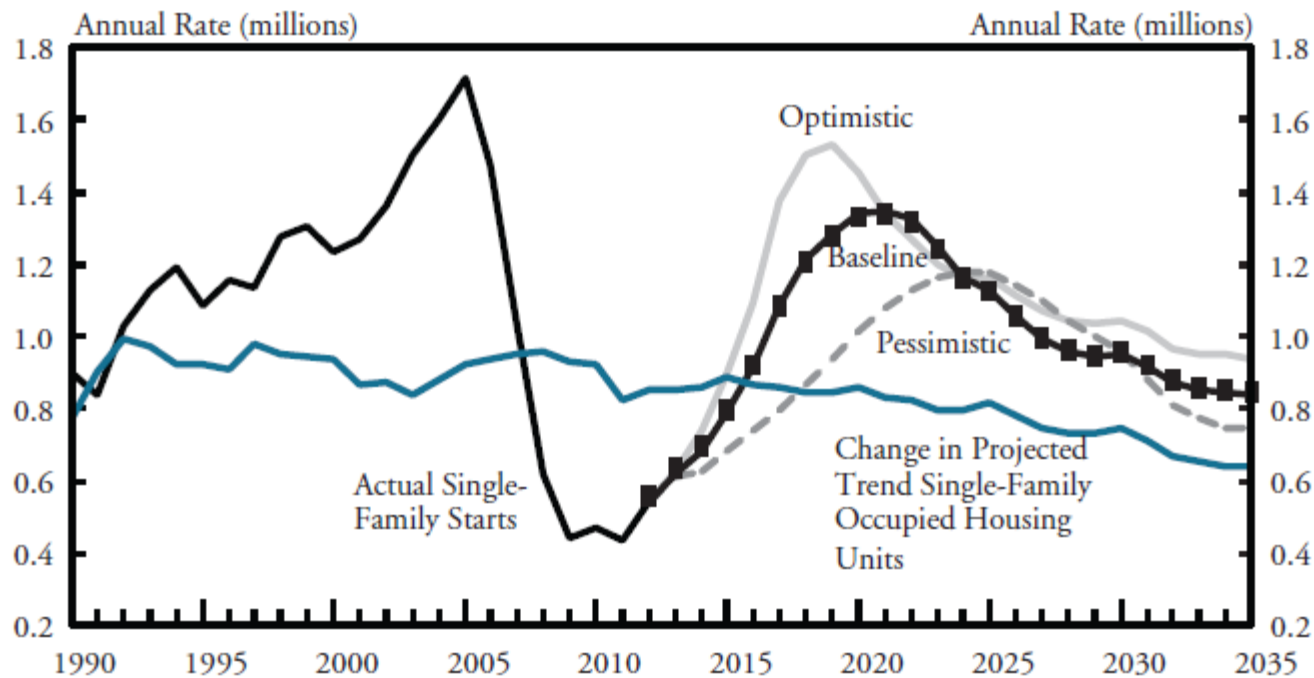
- What do other forecasts look like?
- What about demographics?
- What about single-family vs multi-family?



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Chart 6

## PROJECTED SINGLE-FAMILY STARTS



Sources: Census Bureau, author's calculations.

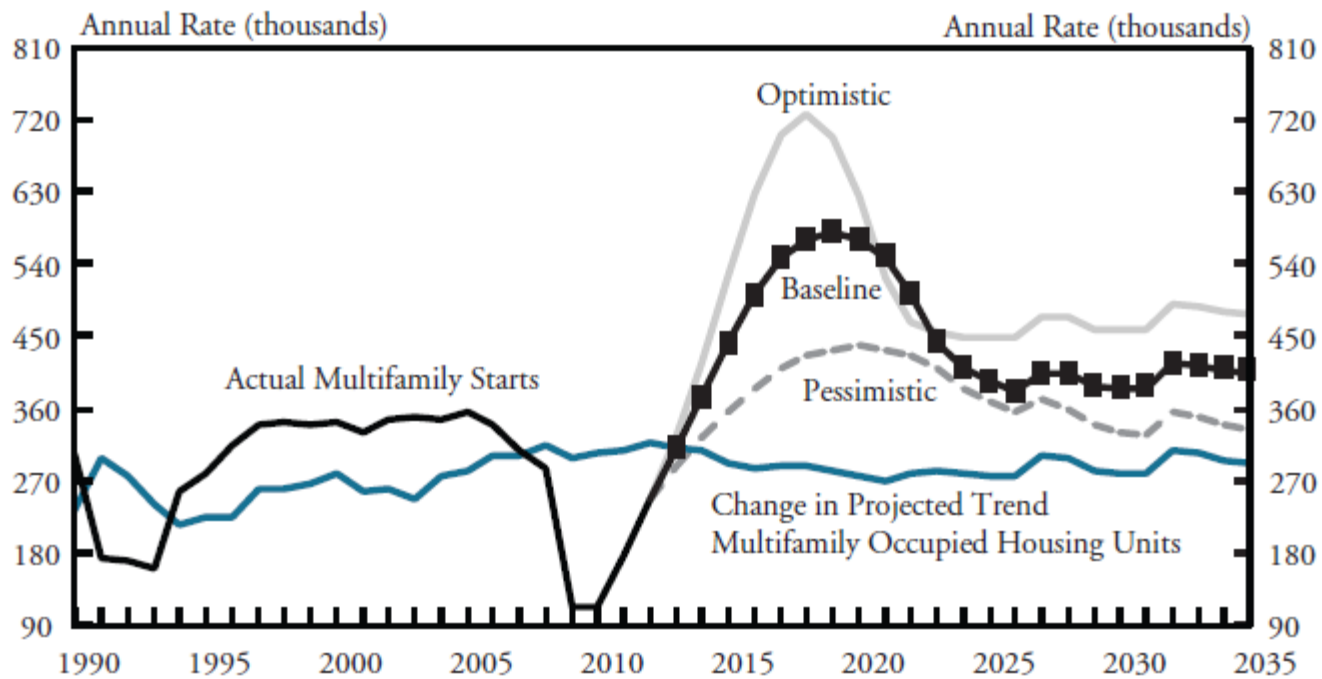
## Rappaport (2013) – based on demographics



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Chart 7

## PROJECTED MULTIFAMILY STARTS



Sources: Census Bureau, author's calculations.



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	Rappaport (2013) Starts Projections		
	SF	MF	total
2013	620	290	910
2014	680	360	1,040
2015	790	420	1,210
2016	910	470	1,380
2017	1,080	520	1,600
2018	1,210	560	1,770
2019	1,280	570	1,850
2020	1,340	560	1,900

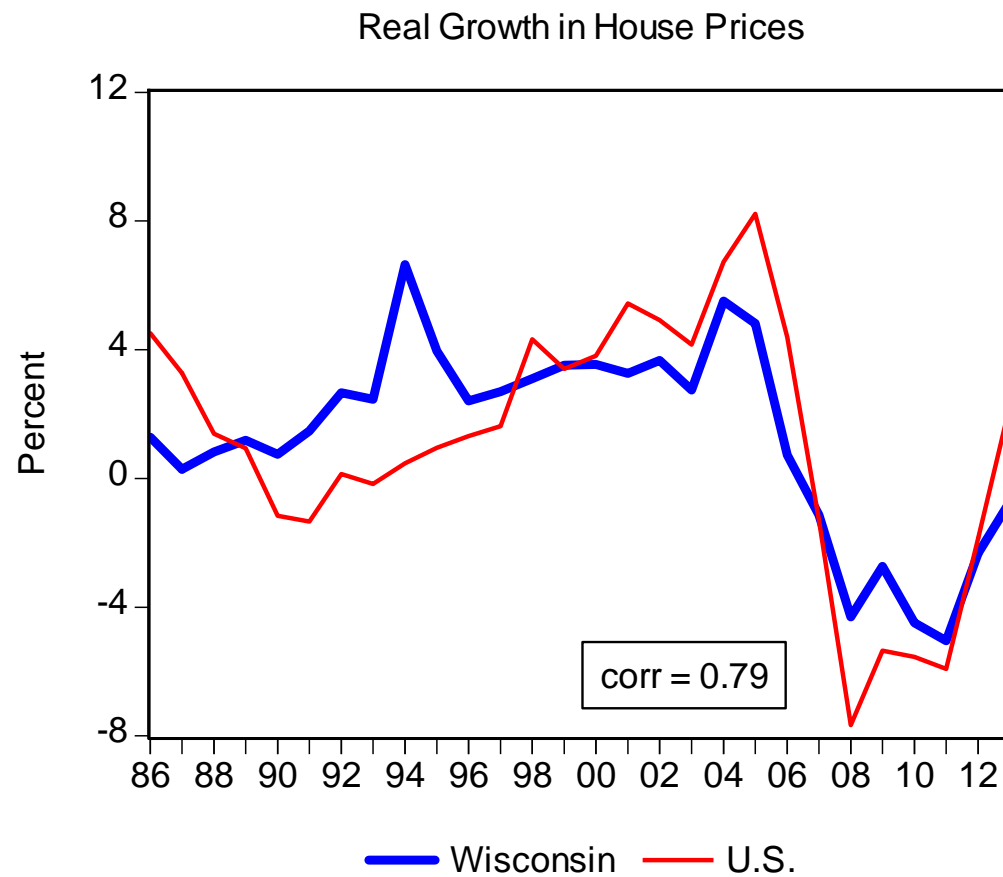


JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## Notes on Wisconsin



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

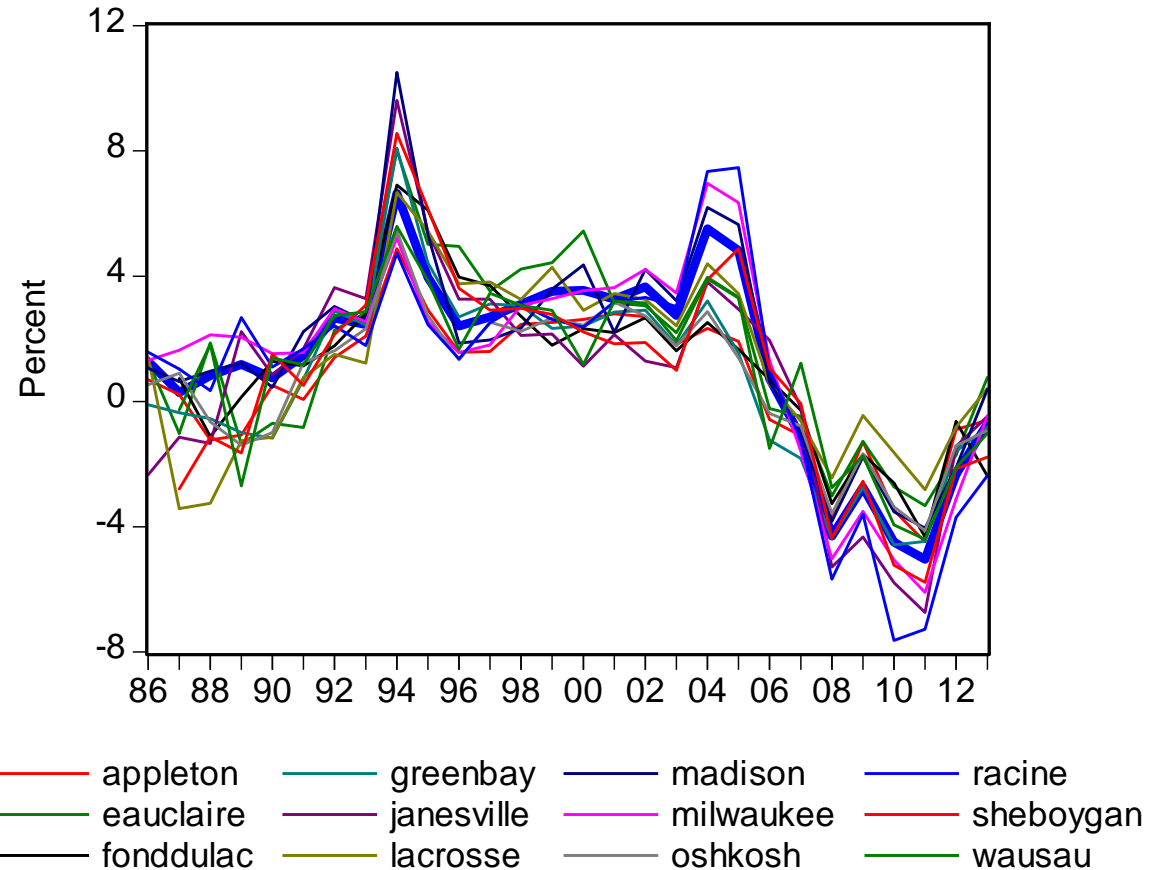


Wisconsin isn't that different from the US



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Real Growth in House Prices

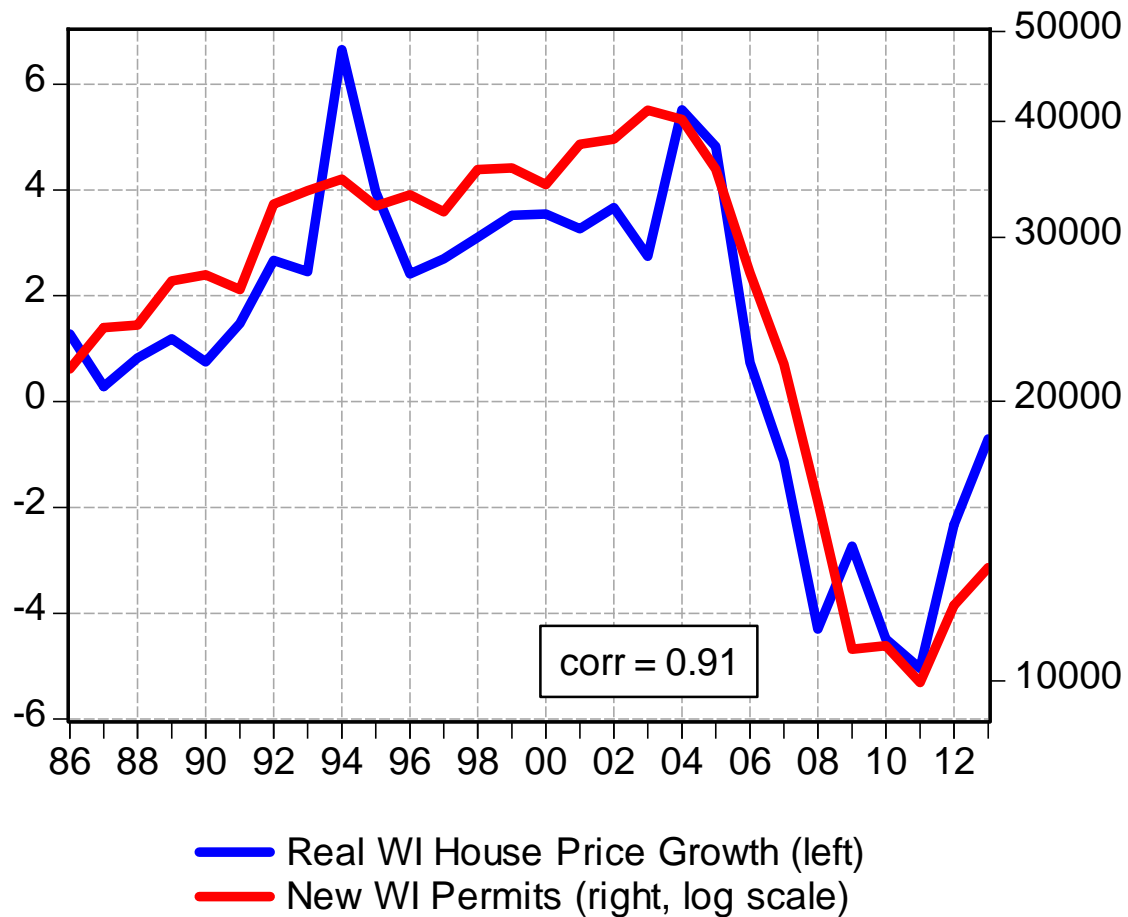


And many places around WI have similar trends





# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

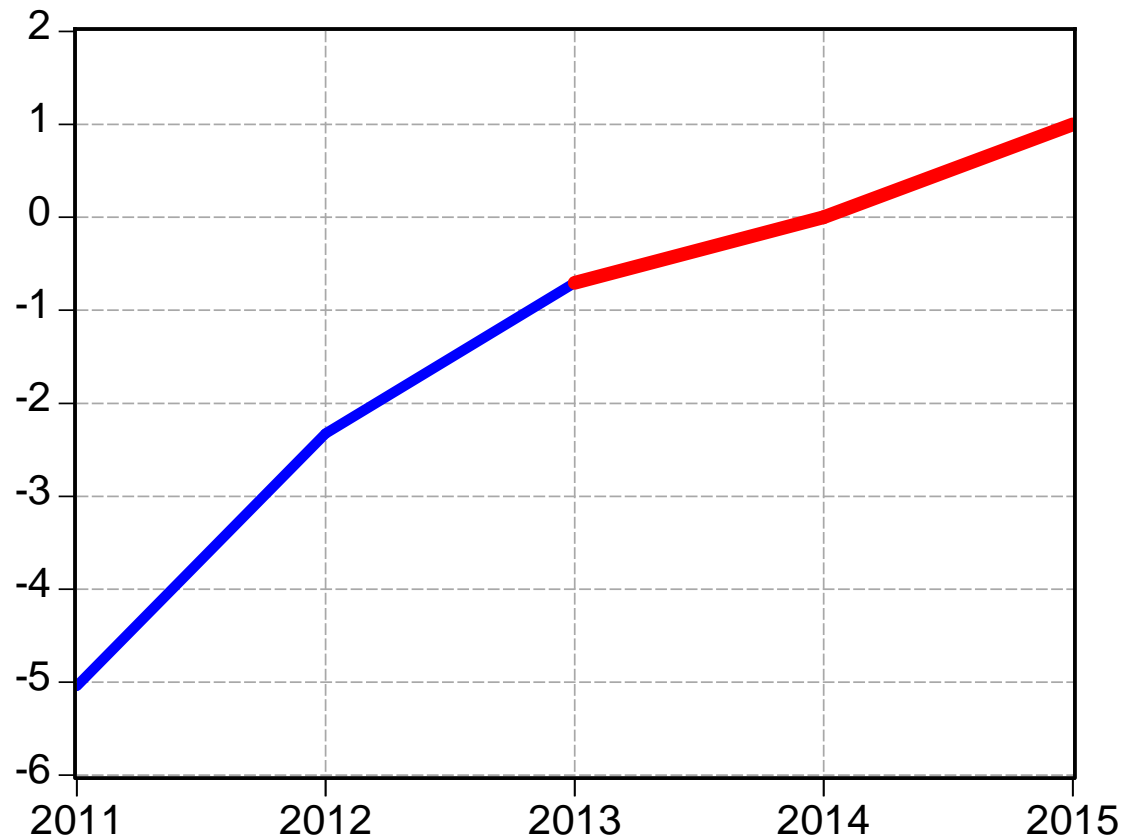


Permits and Prices are Highly Correlated in WI



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Real House Price Growth, WI

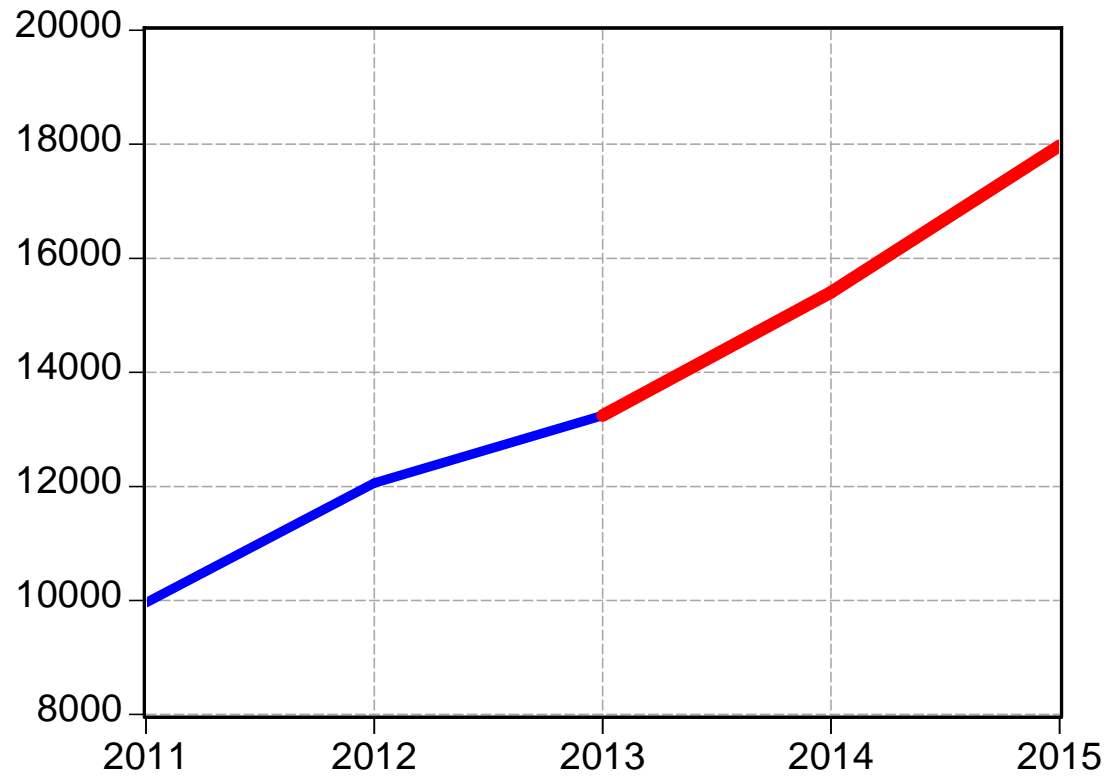


Even if house price growth slowly recovers



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

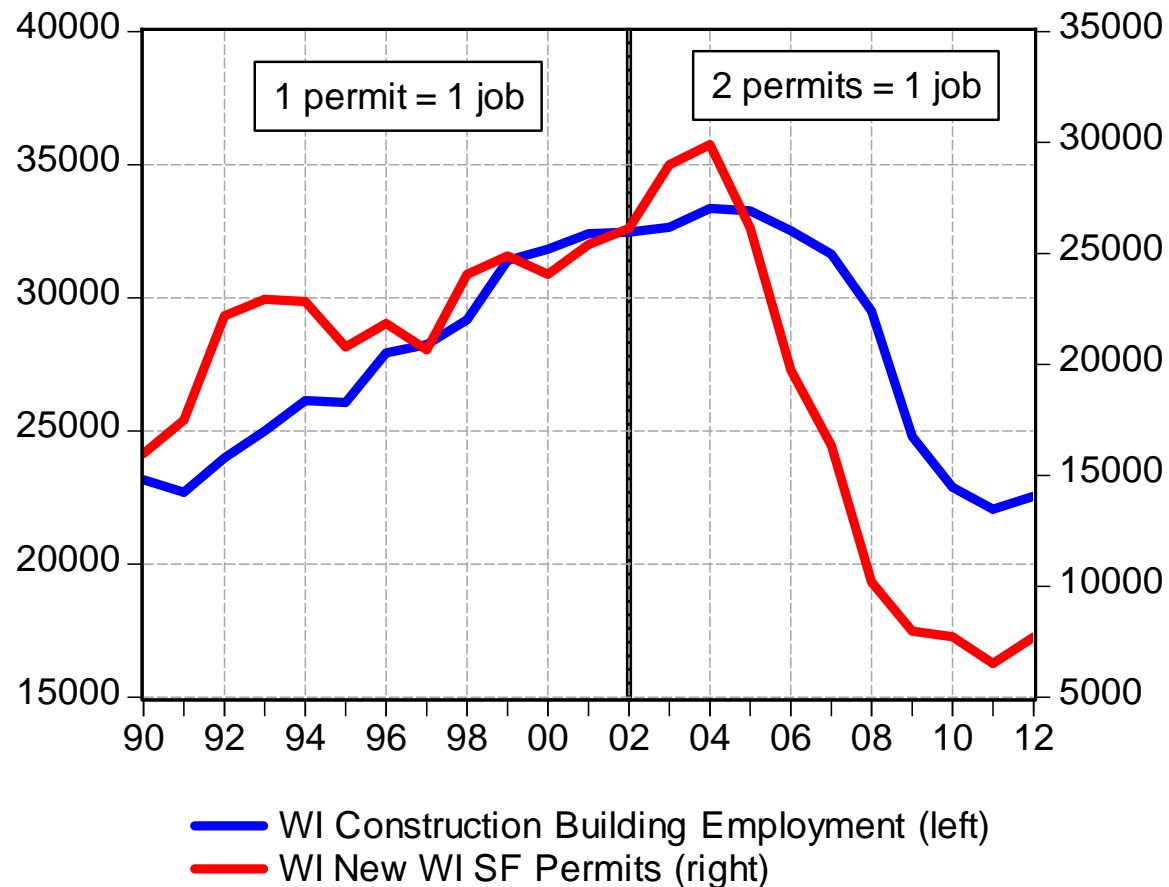
Housing Permits, WI



Permits and activity should increase quickly



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE



1,500 – 4,000 new const (building) jobs by 2015?

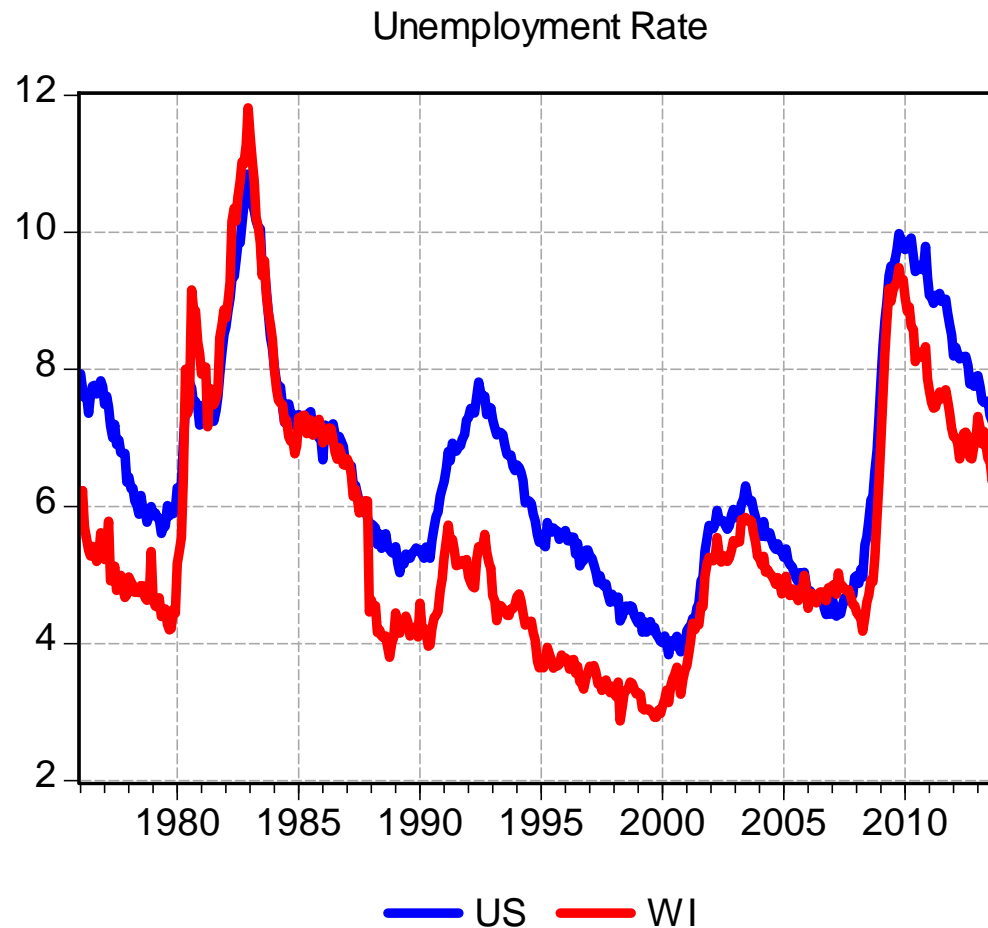


JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## Notes on Unemployment and Employment



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE



Unemployment Rate: Expect a Further Decline



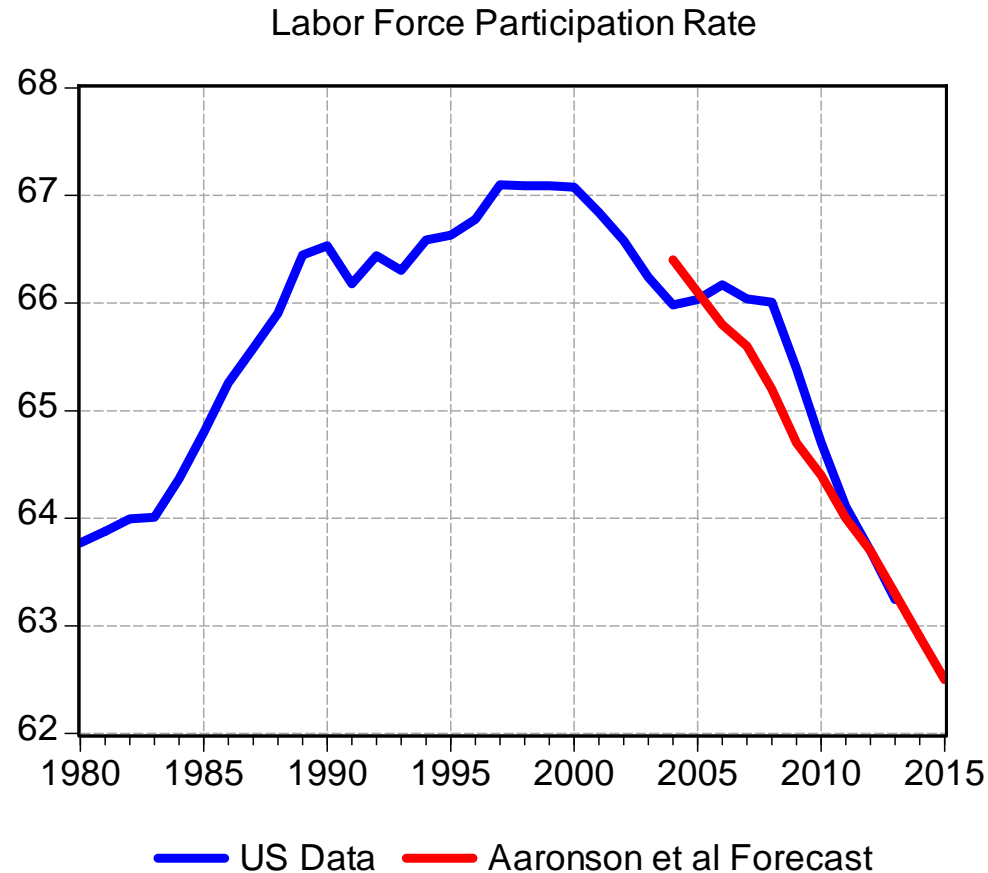
**Table 6. Comparisons of Projected Trend Labor Force Participation Rates and Trend Labor Force Growth**

<i>Year</i>	<i>Authors' model</i>	<i>Congressional Budget Office</i>	<i>Bureau of Labor Statistics</i>	<i>Social Security Administration</i>
<i>Labor force participation rate (percent)</i>				
2004	66.4	66.5	n.a.	66.2
2005	66.1	66.5	66.0	66.3
2006	65.8	66.5	66.0	66.5
2007	65.6	66.5	65.9	66.5
2008	65.2	66.4	65.9	66.5
2009	64.7	66.3	65.9	66.4
2010	64.4	66.2	65.8	66.3
2011	64.0	65.9	65.8	66.2
2012	63.7	65.7	65.7	66.0
2013	63.3	65.4	65.6	65.8
2014	62.9	65.2	65.6	65.5
2015	62.5	65.0	n.a.	65.2

This paper was written in 2004



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE



US Participation Rate might continue to decline





# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	US		WI	
	now	end 2014	now	end 2014
LF Part Rate	62.8%	62.4%	62.8%	62.4%
Unemp Rate	6.7%	6.1%	6.4%	5.8%
Population	246.7	249.2	4,893,780	4,942,718
Lab Force	154.9	155.5	3,072,920	3,083,878
Unemployed	10.4	9.5	197,896	180,098
Employed	144.6	146.0	2,875,024	2,903,780
New Jobs (total)		1,448,438		28,756
New Jobs/Month		120,703		2,396

2014 forecast assuming 1%/year pop growth



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Wisconsin is a bit older than the median state in terms of the age structure of the population
- No reason to believe we will escape forecasted decline in labor force participation
- Recently have had slower than 1% per year population growth ... and its old population



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Top 11		Bottom 11	
Utah	1.73	Michigan	1.11
DC	1.68	Ohio	1.11
Texas	1.50	Iowa	1.10
Alaska	1.49	South Dakota	1.10
Georgia	1.43	New Hampshire	1.08
California	1.42	Pennsylvania	1.05
Colorado	1.38	Florida	1.01
Nevada	1.33	Montana	1.00
Illinois	1.29	Vermont	0.99
Virginia	1.28	West Virginia	0.97
Maryland	1.26	Maine	0.95

Ratio of 21-49 to 50+. Wisconsin is 1.15 (29<sup>th</sup>)

Author's calculations based on the 2008-2012 American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

year	age			all
	<21	21-65	>65	
2008	1,504,154	3,308,688	651,994	5,464,836
2009	1,502,946	3,320,309	665,632	5,488,887
2010	1,525,292	3,321,371	694,170	5,540,833
2011	1,520,668	3,333,873	705,990	5,560,531
2012	1,517,157	3,338,225	722,708	5,578,090
ann % growth	0.2%	0.2%	2.6%	0.5%

WI population, 2008-2012 ... Minimal increase 21-65 category.



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	now	Population Growth	
		0.5%	0%
LF Part Rate	62.8%	62.4%	62.4%
Unemp Rate	6.4%	5.8%	5.8%
Population	4,893,780	4,918,249	4,893,780
Lab Force	3,072,920	3,068,612	3,053,345
Unemployed	197,896	179,207	178,315
Employed	2,875,024	2,889,405	2,875,030
New Jobs (total)		14,381	6

2014 WI forecast with 0% – 0.5% pop growth



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- In-migration is very important for job growth
- How can we get new population to WI ?
- We should target the young, especially 21-34 year old college grads



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

age	Prob of Across-State Move			
	Unconditional	HS	Some Col	Col Grad
21-24	4.9%	3.6%	3.7%	11.3%
25-29	4.5%	3.1%	3.9%	7.1%
30-34	3.2%	2.3%	2.9%	4.7%
35-39	2.4%	1.9%	2.2%	3.1%
40-44	1.8%	1.5%	1.8%	2.2%
45-49	1.4%	1.3%	1.5%	1.6%
50-54	1.3%	1.2%	1.4%	1.6%
55-59	1.3%	1.1%	1.3%	1.5%
60-64	1.2%	1.1%	1.3%	1.5%
65-69	1.2%	1.0%	1.3%	1.4%
70+	1.0%	0.9%	1.0%	1.2%

Author's calculations based on the 2010-2012 American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Where do the most likely movers live?  
(as a percent of the population in the state)





## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Top 11		Bottom 11	
DC	48%	Kentucky	32%
Utah	45%	Michigan	32%
Alaska	38%	Ohio	32%
Colorado	38%	Arkansas	32%
Texas	38%	Montana	32%
California	37%	Pennsylvania	31%
North Dakota	37%	New Hampshire	31%
Georgia	37%	Florida	30%
Illinois	36%	Vermont	30%
Virginia	36%	West Virginia	28%
Minnesota	36%	Maine	28%

Percent of State that is a High Prob Mover (Orange)  
WI = 33%. If Wisconsin added 3% = 121,828 people.

Author's calculations based on the 2008-2012 American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- What are current migration patterns?



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	TO WI		FROM WI
Illinois	26,960	Minnesota	22,335
Minnesota	20,651	Illinois	19,304
California	7,658	Florida	9,688
Michigan	6,955	California	8,626
Florida	6,834	Arizona	7,131
Indiana	4,889	Texas	6,824
Arizona	4,313	Michigan	6,720
Colorado	3,401	Colorado	4,793
Iowa	3,263	Iowa	4,094
Texas	3,237	Indiana	3,529

21+. Total inflows to WI were 130,000 per year  
Total outflows from WI were 141,000 per year



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	NET to WI		NET to WI
Illinois	7657	Texas	-3587
Indiana	1360	Florida	-2853
Ohio	1301	Arizona	-2818
New York	800	Minnesota	-1684
Puerto Rico	795	Missouri	-1543
New Mexico	714	Colorado	-1392
Rhode Island	580	Washington	-1361
Hawaii	466	Utah	-1075
Idaho	411	Nebraska	-989
Virginia	364	Tennessee	-972

These are net flows of people, ages 21+

Author's calculations based on the 2008-2012 American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Are our net outflows retirement related?



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

	NET to WI		NET to WI
Illinois	2490	Texas	-1698
New York	720	Missouri	-1043
New Mexico	697	California	-808
Hawaii	468	Minnesota	-794
Alaska	436	Utah	-687
Maryland	304	Washington	-563
Louisiana	302	DC	-547
Ohio	249	Colorado	-536
Florida	230	South Dakota	-525
Delaware	227	Arkansas	-496

Ages 25-39

Author's calculations based on the 2008-2012 American Community Survey



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

WISCONSIN			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	1,411	2,740	-6,706
25-29	1,510	-47	-2,014
30-34	-224	-491	-770
35-39	-360	-1,015	108
40-44	-258	480	516
45-49	-368	-540	-489
50-54	634	-224	-925
55-59	80	312	-1,254
60-64	424	-317	-999
65-69	868	-354	-230
>=70	-978	-176	-1,276
total by edu	2,739	368	-14,039
total			-10,932

Annual averages, 2008-2012. Data derived from American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Compare to our “trading partners” for people





# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

MINNESOTA			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	-628	-2,876	4,049
25-29	-531	410	852
30-34	1,795	-283	58
35-39	-666	-516	-2,112
40-44	-1,333	-138	1,135
45-49	436	-95	582
50-54	-388	241	-949
55-59	-506	-605	1,000
60-64	-893	-758	-1,055
65-69	-881	-345	-292
>=70	216	-216	-324
total by edu	-3,379	-5,181	2,944
total			-5,616



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

ILLINOIS			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	-4,074	-3,901	12,608
25-29	-547	-482	-1,783
30-34	-1,891	-1,715	-7,862
35-39	-2,518	-914	-2,217
40-44	-812	-2,954	-1,871
45-49	-2,240	-22	-3,437
50-54	473	-1,631	-4,525
55-59	-2,594	-2,036	-2,744
60-64	-3,927	-728	-3,389
65-69	-2,167	-1,443	-2,304
>=70	-3,478	-1,070	-2,320
total by edu	-23,775	-16,896	-19,844
total			-60,515

MICHIGAN			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	-355	-2,073	-12,271
25-29	-3,432	-4,030	-7,588
30-34	-1,125	-1,626	-6,383
35-39	-1,448	-1,379	-3,185
40-44	-2,579	-2,048	-2,994
45-49	-1,963	-1,412	-2,168
50-54	-2,268	-1,583	-2,552
55-59	-3,000	-561	-2,338
60-64	-1,882	-341	-3,149
65-69	-1,096	-570	-1,786
>=70	-3,072	-1,764	-1,673
total by edu	-22,220	-17,387	-46,087
total			-85,694

Author's calculations based on the 2008-2012 American Community Survey



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

CALIFORNIA			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	-9,549	-4,497	19,542
25-29	-11,080	-7,723	15,786
30-34	-8,179	-5,003	4,285
35-39	-9,362	-5,450	-1,680
40-44	-10,377	-3,373	-1,766
45-49	-5,908	-5,703	-572
50-54	-8,266	-2,305	-1,670
55-59	-3,161	-6,841	-1,690
60-64	-2,012	-3,801	-4,581
65-69	-2,875	-2,937	-543
>=70	462	68	811
total by edu	-70,307	-47,565	27,922
total			-89,950

TEXAS			
	net migration		
age	<= HS	SOME COL	>= COL
21-24	4,539	6,010	16,157
25-29	13,170	9,083	15,903
30-34	9,538	5,770	9,603
35-39	7,685	4,484	8,804
40-44	9,103	3,905	3,654
45-49	3,109	3,195	4,154
50-54	4,231	2,350	3,764
55-59	700	1,273	3,110
60-64	3,332	932	1,496
65-69	2,858	880	181
>=70	6,330	1,247	2,467
total by edu	64,595	39,129	69,293
total			173,017

Author's calculations based on the 2008-2012 American Community Survey



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- To have any job growth we need more people
- Recruit 21 – 39 year olds w/ college degree?
  - Most likely to move
  - Least drain on the NPV of our retirement system
- We are currently LOSING this age group
- Where does this group want to live and why?



JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

Thanks



## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Extra slides on
  - Migration data
  - WI MSA-level house prices and permits



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

WISCONSIN									
age	inmigration			outmigration			net migration		
	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	8,671	9,196	9,158	7,260	6,456	15,864	<b>1,411</b>	<b>2,740</b>	<b>-6,706</b>
25-29	7,084	5,301	13,980	5,574	5,348	15,994	<b>1,510</b>	<b>-47</b>	<b>-2,014</b>
30-34	4,829	3,929	8,928	5,053	4,420	9,698	<b>-224</b>	<b>-491</b>	<b>-770</b>
35-39	3,216	2,870	6,380	3,576	3,885	6,272	<b>-360</b>	<b>-1,015</b>	<b>108</b>
40-44	3,453	2,820	3,820	3,711	2,340	3,304	<b>-258</b>	<b>480</b>	<b>516</b>
45-49	3,683	2,392	2,899	4,051	2,932	3,388	<b>-368</b>	<b>-540</b>	<b>-489</b>
50-54	3,141	1,912	2,293	2,507	2,136	3,218	<b>634</b>	<b>-224</b>	<b>-925</b>
55-59	2,259	2,005	1,969	2,179	1,693	3,223	<b>80</b>	<b>312</b>	<b>-1,254</b>
60-64	2,072	1,194	1,540	1,648	1,511	2,539	<b>424</b>	<b>-317</b>	<b>-999</b>
65-69	2,156	442	922	1,288	796	1,152	<b>868</b>	<b>-354</b>	<b>-230</b>
>=70	3,515	814	922	4,493	990	2,198	<b>-978</b>	<b>-176</b>	<b>-1,276</b>
total by edu	44,079	32,875	52,811	41,340	32,507	66,850	<b>2,739</b>	<b>368</b>	<b>-14,039</b>
total			129,765			140,697			<b>-10,932</b>



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

MICHIGAN									
	inmigration			outmigration			net migration		
age	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	12,091	8,872	10,346	12,446	10,945	22,617	<b>-355</b>	<b>-2,073</b>	<b>-12,271</b>
25-29	9,276	7,383	16,042	12,708	11,413	23,630	<b>-3,432</b>	<b>-4,030</b>	<b>-7,588</b>
30-34	8,329	4,508	11,109	9,454	6,134	17,492	<b>-1,125</b>	<b>-1,626</b>	<b>-6,383</b>
35-39	6,342	4,484	7,924	7,790	5,863	11,109	<b>-1,448</b>	<b>-1,379</b>	<b>-3,185</b>
40-44	5,652	2,906	4,421	8,231	4,954	7,415	<b>-2,579</b>	<b>-2,048</b>	<b>-2,994</b>
45-49	4,918	3,475	3,002	6,881	4,887	5,170	<b>-1,963</b>	<b>-1,412</b>	<b>-2,168</b>
50-54	4,602	2,515	3,004	6,870	4,098	5,556	<b>-2,268</b>	<b>-1,583</b>	<b>-2,552</b>
55-59	4,143	2,679	2,655	7,143	3,240	4,993	<b>-3,000</b>	<b>-561</b>	<b>-2,338</b>
60-64	2,958	2,489	2,114	4,840	2,830	5,263	<b>-1,882</b>	<b>-341</b>	<b>-3,149</b>
65-69	2,662	1,650	1,064	3,758	2,220	2,850	<b>-1,096</b>	<b>-570</b>	<b>-1,786</b>
>=70	6,400	787	2,075	9,472	2,551	3,748	<b>-3,072</b>	<b>-1,764</b>	<b>-1,673</b>
total by edu	67,373	41,748	63,756	89,593	59,135	109,843	<b>-22,220</b>	<b>-17,387</b>	<b>-46,087</b>
total			172,877			258,571			<b>-85,694</b>





# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

ILLINOIS									
	inmigration			outmigration			net migration		
age	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	11,872	13,613	34,961	15,946	17,514	22,353	<b>-4,074</b>	<b>-3,901</b>	<b>12,608</b>
25-29	14,602	12,402	41,390	15,149	12,884	43,173	<b>-547</b>	<b>-482</b>	<b>-1,783</b>
30-34	9,989	7,804	22,840	11,880	9,519	30,702	<b>-1,891</b>	<b>-1,715</b>	<b>-7,862</b>
35-39	7,538	6,042	14,854	10,056	6,956	17,071	<b>-2,518</b>	<b>-914</b>	<b>-2,217</b>
40-44	7,882	4,294	8,622	8,694	7,248	10,493	<b>-812</b>	<b>-2,954</b>	<b>-1,871</b>
45-49	6,678	4,651	5,400	8,918	4,673	8,837	<b>-2,240</b>	<b>-22</b>	<b>-3,437</b>
50-54	7,545	3,663	4,458	7,072	5,294	8,983	<b>473</b>	<b>-1,631</b>	<b>-4,525</b>
55-59	3,690	2,546	3,952	6,284	4,582	6,696	<b>-2,594</b>	<b>-2,036</b>	<b>-2,744</b>
60-64	4,108	2,240	2,757	8,035	2,968	6,146	<b>-3,927</b>	<b>-728</b>	<b>-3,389</b>
65-69	2,162	1,156	1,552	4,329	2,599	3,856	<b>-2,167</b>	<b>-1,443</b>	<b>-2,304</b>
>=70	7,066	1,403	2,124	10,544	2,473	4,444	<b>-3,478</b>	<b>-1,070</b>	<b>-2,320</b>
total by edu	83,132	59,814	142,910	106,907	76,710	162,754	<b>-23,775</b>	<b>-16,896</b>	<b>-19,844</b>
total			285,856			346,371			<b>-60,515</b>



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## MINNESOTA

age	inmigration			outmigration			net migration		
	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	6,882	7,982	15,780	7,510	10,858	11,731	<b>-628</b>	<b>-2,876</b>	<b>4,049</b>
25-29	5,620	8,076	16,706	6,151	7,666	15,854	<b>-531</b>	<b>410</b>	<b>852</b>
30-34	5,483	3,643	10,222	3,688	3,926	10,164	<b>1,795</b>	<b>-283</b>	<b>58</b>
35-39	2,962	2,194	4,566	3,628	2,710	6,678	<b>-666</b>	<b>-516</b>	<b>-2,112</b>
40-44	2,478	2,706	4,353	3,811	2,844	3,218	<b>-1,333</b>	<b>-138</b>	<b>1,135</b>
45-49	3,240	2,068	3,374	2,804	2,163	2,792	<b>436</b>	<b>-95</b>	<b>582</b>
50-54	2,771	1,908	2,521	3,159	1,667	3,470	<b>-388</b>	<b>241</b>	<b>-949</b>
55-59	1,842	1,259	3,155	2,348	1,864	2,155	<b>-506</b>	<b>-605</b>	<b>1,000</b>
60-64	1,065	1,156	1,147	1,958	1,914	2,202	<b>-893</b>	<b>-758</b>	<b>-1,055</b>
65-69	1,313	729	1,511	2,194	1,074	1,803	<b>-881</b>	<b>-345</b>	<b>-292</b>
>=70	3,781	942	1,768	3,565	1,158	2,092	<b>216</b>	<b>-216</b>	<b>-324</b>
total by edu	37,437	32,663	65,103	40,816	37,844	62,159	<b>-3,379</b>	<b>-5,181</b>	<b>2,944</b>
total			135,203			140,819			<b>-5,616</b>



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

CALIFORNIA									
age	inmigration			outmigration			net migration		
	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	36,123	32,433	49,340	45,672	36,930	29,798	<b>-9,549</b>	<b>-4,497</b>	<b>19,542</b>
25-29	32,632	28,191	80,902	43,712	35,914	65,116	<b>-11,080</b>	<b>-7,723</b>	<b>15,786</b>
30-34	20,696	18,249	52,605	28,875	23,252	48,320	<b>-8,179</b>	<b>-5,003</b>	<b>4,285</b>
35-39	16,716	13,570	33,903	26,078	19,020	35,583	<b>-9,362</b>	<b>-5,450</b>	<b>-1,680</b>
40-44	14,035	10,768	22,724	24,412	14,141	24,490	<b>-10,377</b>	<b>-3,373</b>	<b>-1,766</b>
45-49	12,665	8,522	16,418	18,573	14,225	16,990	<b>-5,908</b>	<b>-5,703</b>	<b>-572</b>
50-54	11,760	10,049	14,514	20,026	12,354	16,184	<b>-8,266</b>	<b>-2,305</b>	<b>-1,670</b>
55-59	10,931	6,445	13,386	14,092	13,286	15,076	<b>-3,161</b>	<b>-6,841</b>	<b>-1,690</b>
60-64	9,924	5,657	9,245	11,936	9,458	13,826	<b>-2,012</b>	<b>-3,801</b>	<b>-4,581</b>
65-69	5,856	3,866	7,043	8,731	6,803	7,586	<b>-2,875</b>	<b>-2,937</b>	<b>-543</b>
>=70	19,041	7,144	9,845	18,579	7,076	9,034	<b>462</b>	<b>68</b>	<b>811</b>
total by edu	190,379	144,894	309,925	260,686	192,459	282,003	<b>-70,307</b>	<b>-47,565</b>	<b>27,922</b>
total			645,198			735,148			<b>-89,950</b>



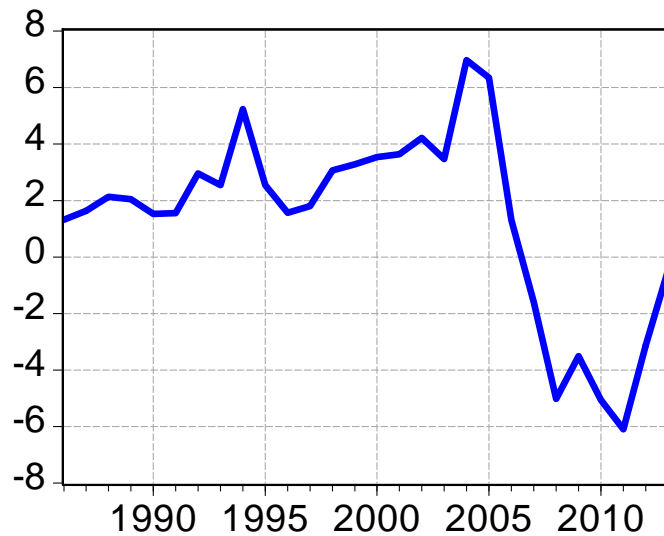
# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

TEXAS									
age	inmigration			outmigration			net migration		
	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL	<= HS	SOME COL	>= COL
21-24	38,295	27,931	36,915	33,756	21,921	20,758	<b>4,539</b>	<b>6,010</b>	<b>16,157</b>
25-29	44,672	31,997	57,808	31,502	22,914	41,905	<b>13,170</b>	<b>9,083</b>	<b>15,903</b>
30-34	32,490	22,432	40,617	22,952	16,662	31,014	<b>9,538</b>	<b>5,770</b>	<b>9,603</b>
35-39	25,753	17,982	30,525	18,068	13,498	21,721	<b>7,685</b>	<b>4,484</b>	<b>8,804</b>
40-44	25,105	14,461	19,882	16,002	10,556	16,228	<b>9,103</b>	<b>3,905</b>	<b>3,654</b>
45-49	20,180	12,851	15,376	17,071	9,656	11,222	<b>3,109</b>	<b>3,195</b>	<b>4,154</b>
50-54	17,637	10,270	13,587	13,406	7,920	9,823	<b>4,231</b>	<b>2,350</b>	<b>3,764</b>
55-59	12,419	7,605	12,032	11,719	6,332	8,922	<b>700</b>	<b>1,273</b>	<b>3,110</b>
60-64	11,900	6,043	8,419	8,568	5,111	6,923	<b>3,332</b>	<b>932</b>	<b>1,496</b>
65-69	8,580	4,404	4,592	5,722	3,524	4,411	<b>2,858</b>	<b>880</b>	<b>181</b>
>=70	18,617	5,414	7,770	12,287	4,167	5,303	<b>6,330</b>	<b>1,247</b>	<b>2,467</b>
total by edu	255,648	161,390	247,523	191,053	122,261	178,230	<b>64,595</b>	<b>39,129</b>	<b>69,293</b>
total			664,561			491,544			<b>173,017</b>

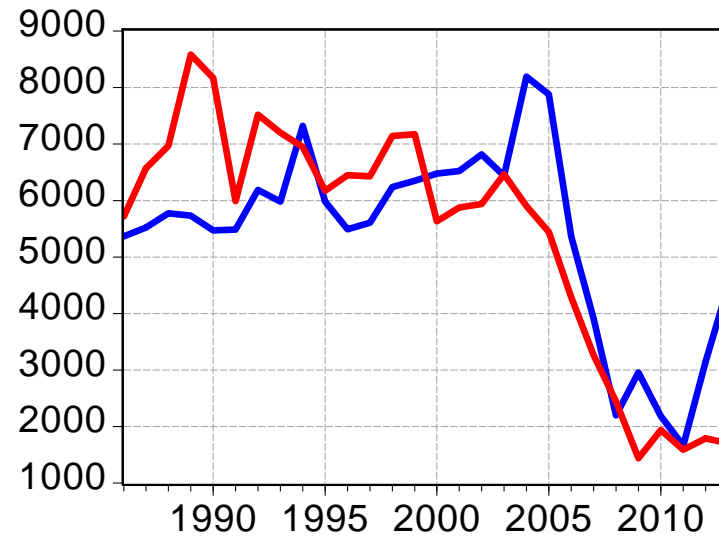


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

milwaukee



Growth in House Prices

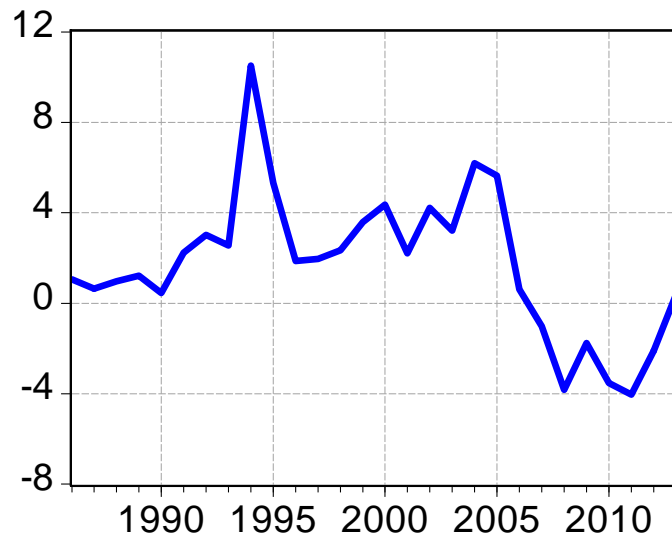


Permits (Red) and Forecast (Blue)

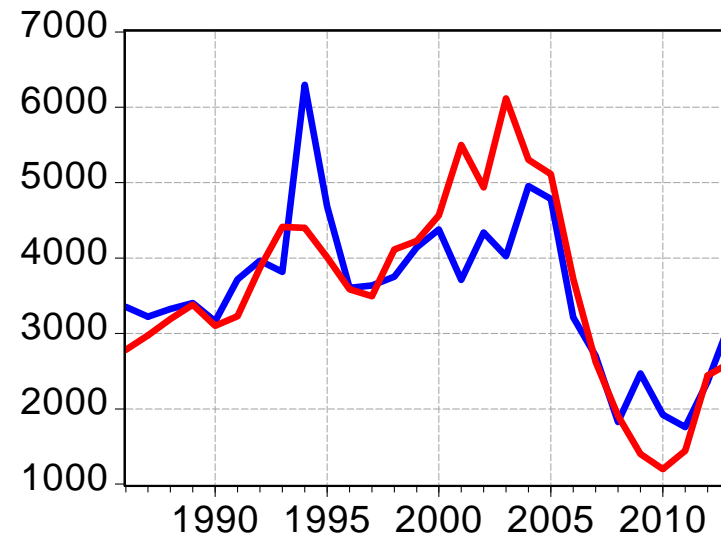


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

madison



Growth in House Prices

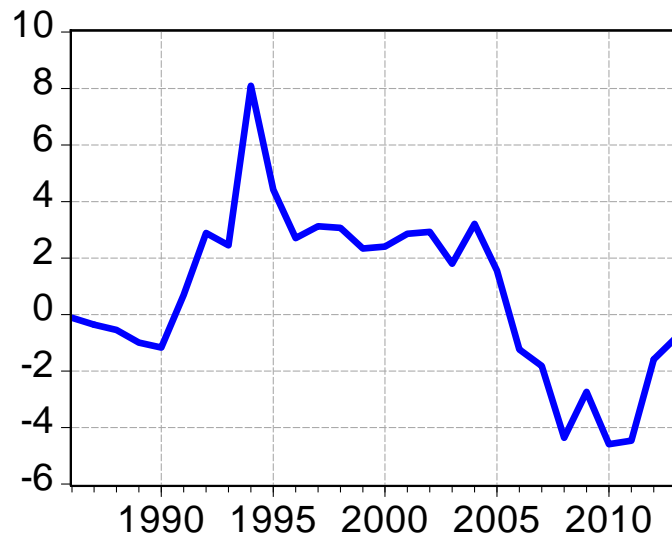


Permits (Red) and Forecast (Blue)

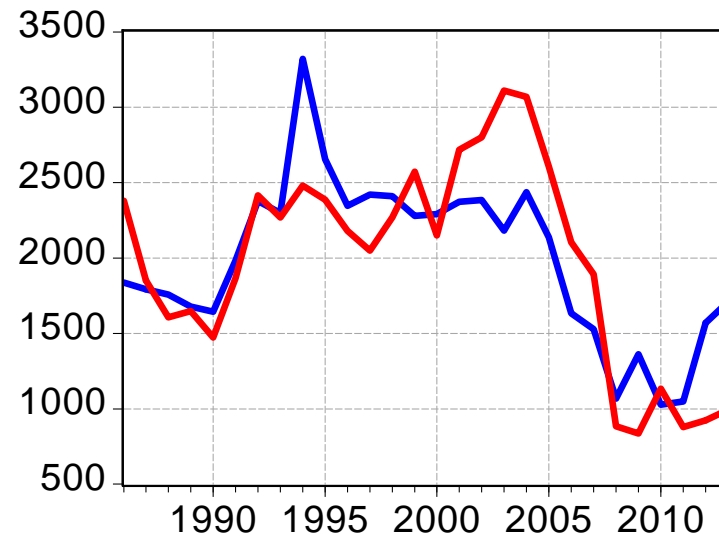


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

greenbay



Growth in House Prices

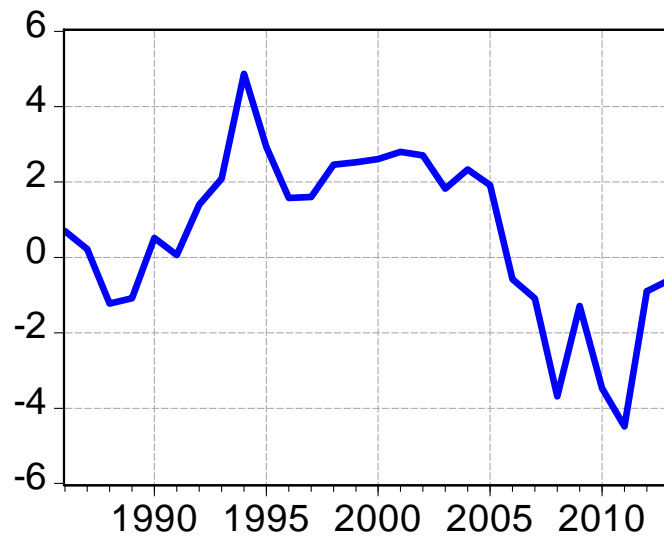


Permits (Red) and Forecast (Blue)

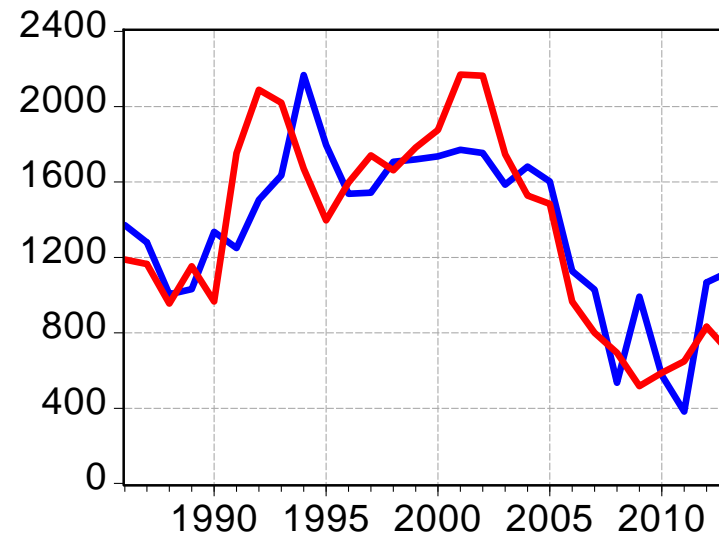


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

appleton



Growth in House Prices



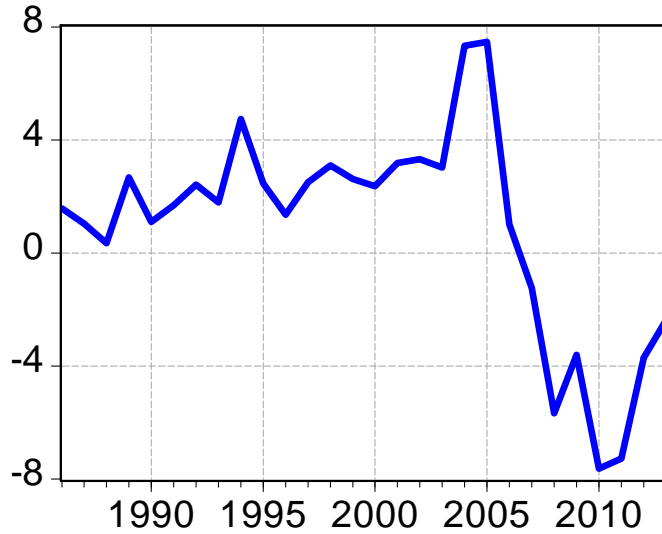
Permits (Red) and Forecast (Blue)



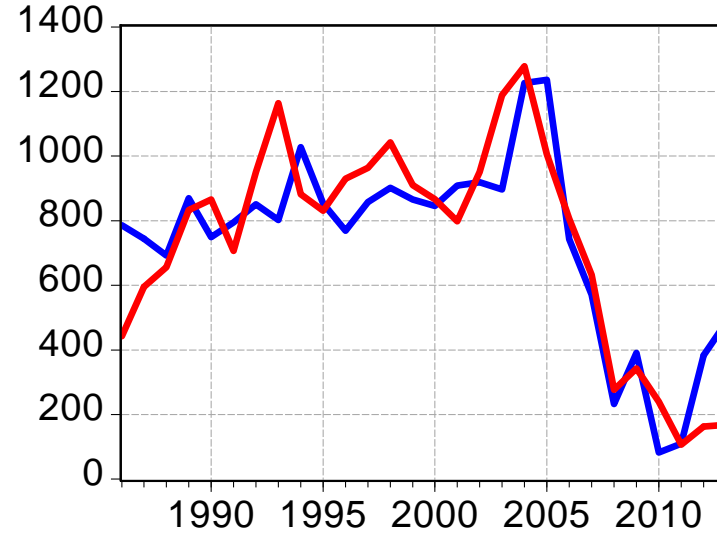


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

racine



Growth in House Prices

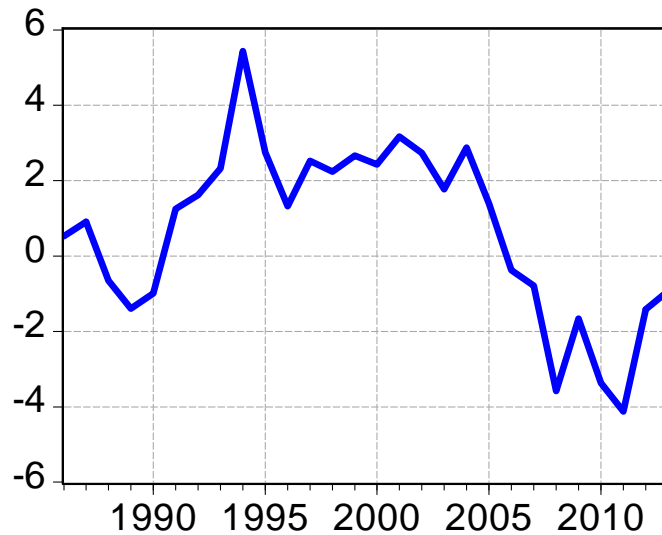


Permits (Red) and Forecast (Blue)

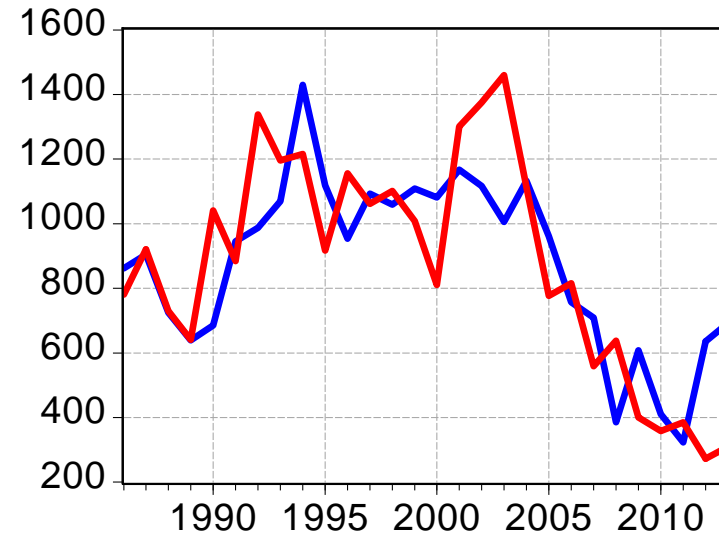


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

oshkosh



Growth in House Prices

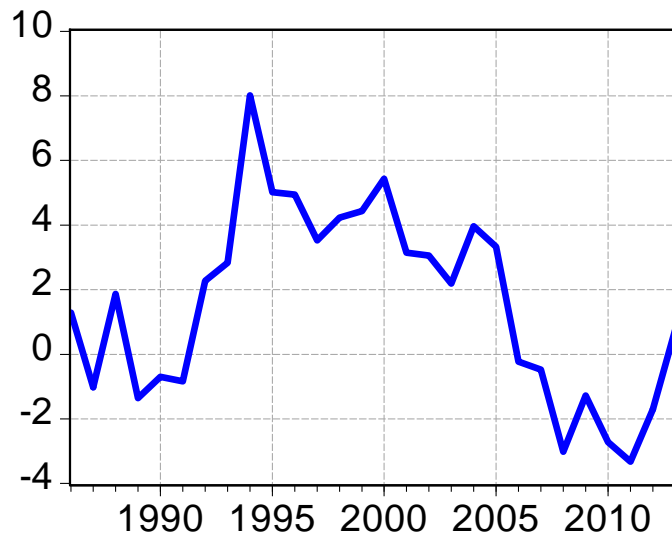


Permits (Red) and Forecast (Blue)

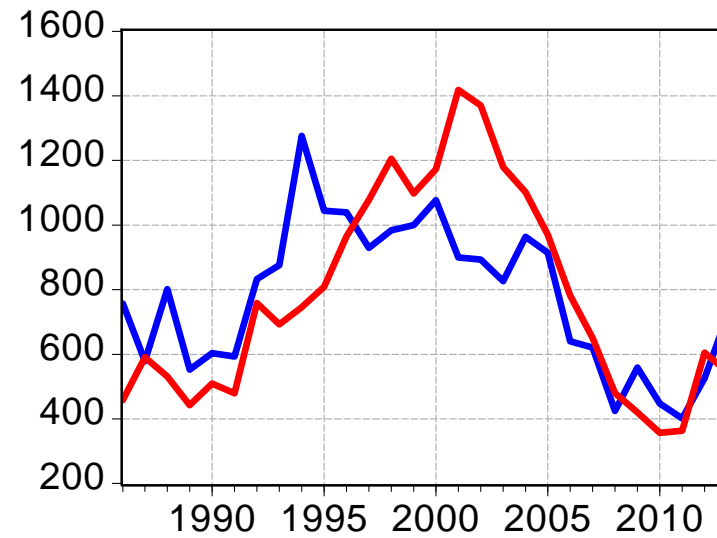


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

eauc Claire



Growth in House Prices

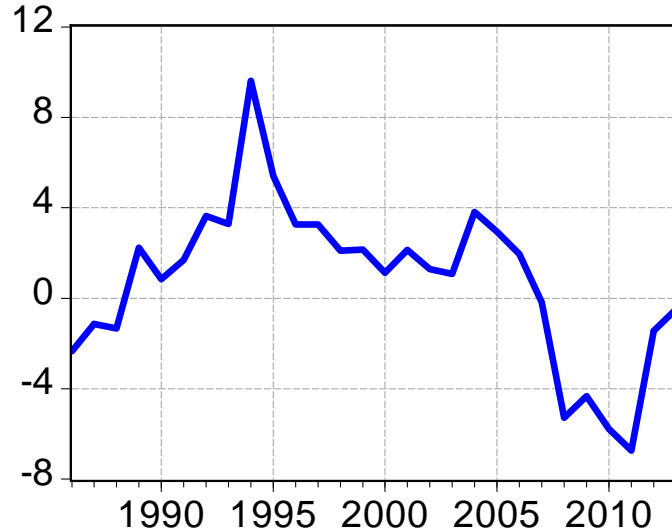


Permits (Red) and Forecast (Blue)

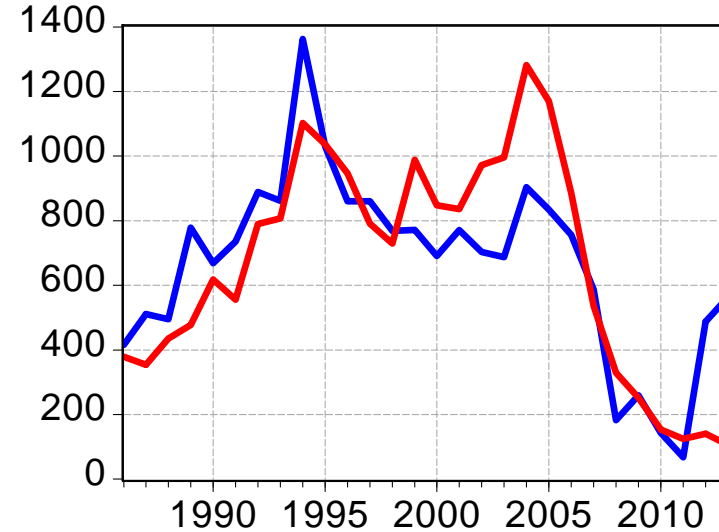


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

janesville



Growth in House Prices

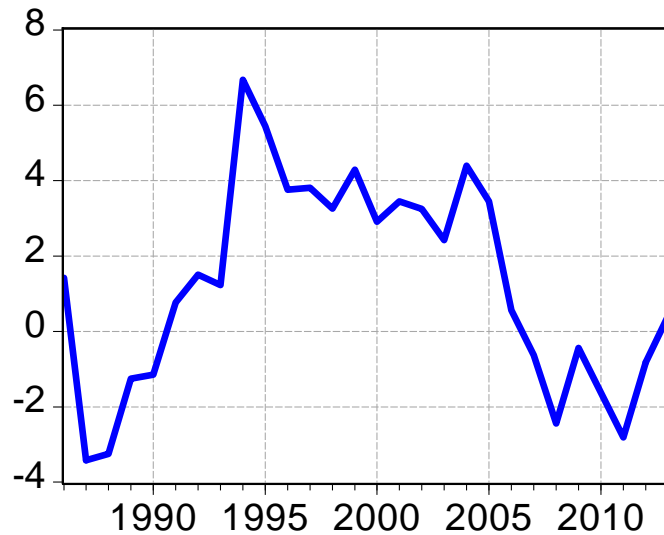


Permits (Red) and Forecast (Blue)

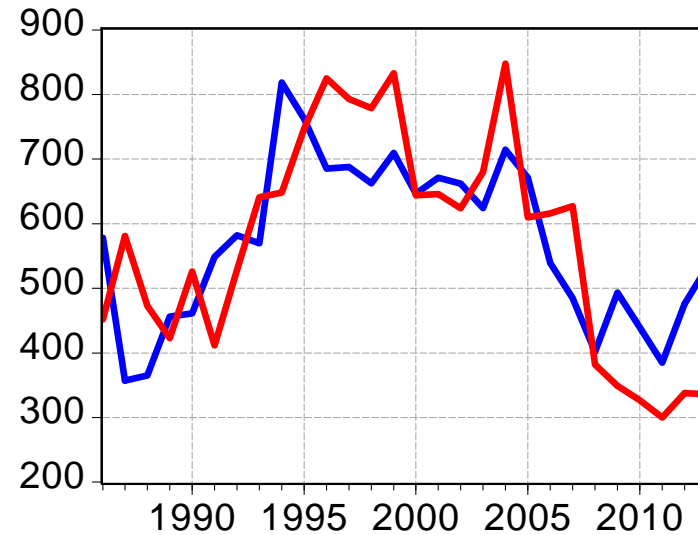


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## Iacrosse



Growth in House Prices

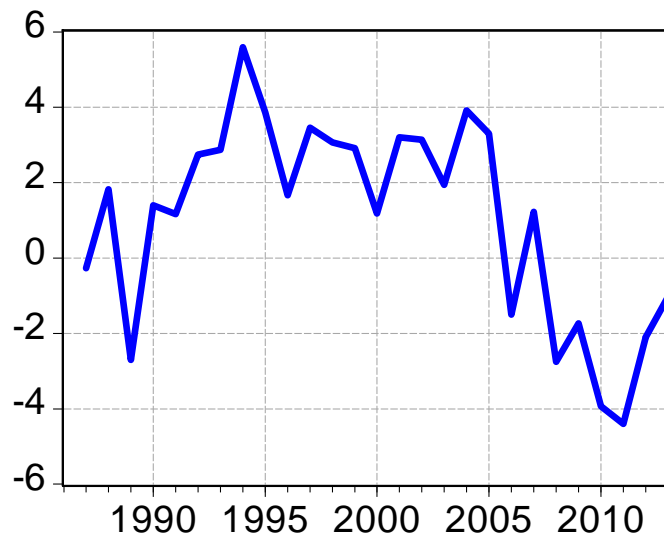


Permits (Red) and Forecast (Blue)

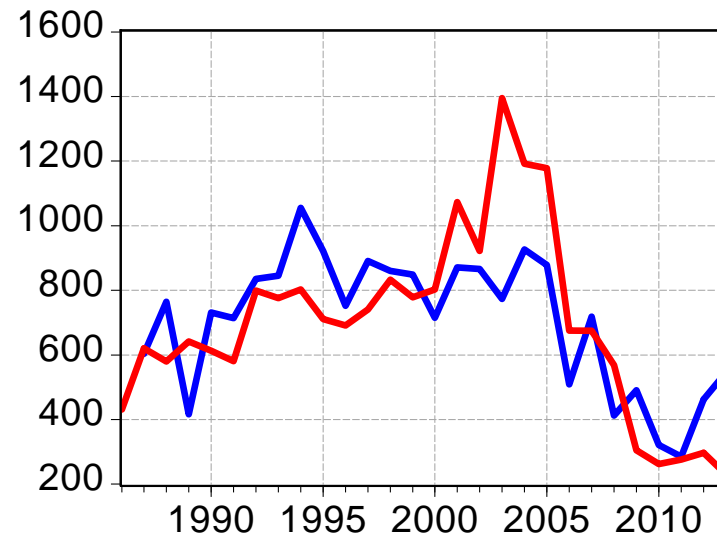


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

wausau



Growth in House Prices

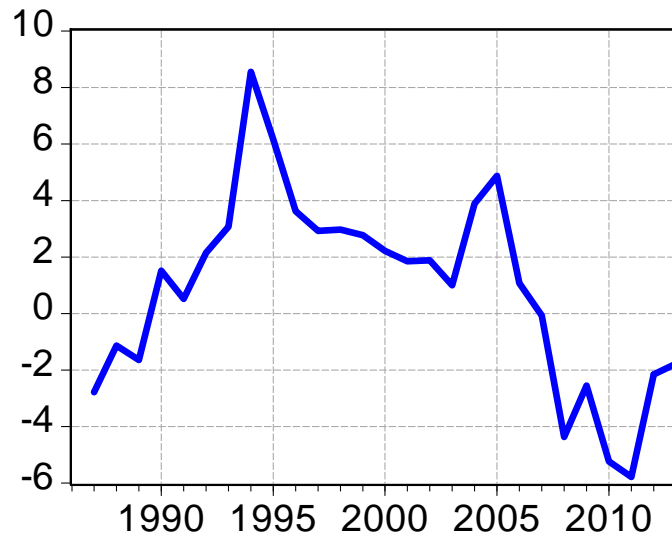


Permits (Red) and Forecast (Blue)

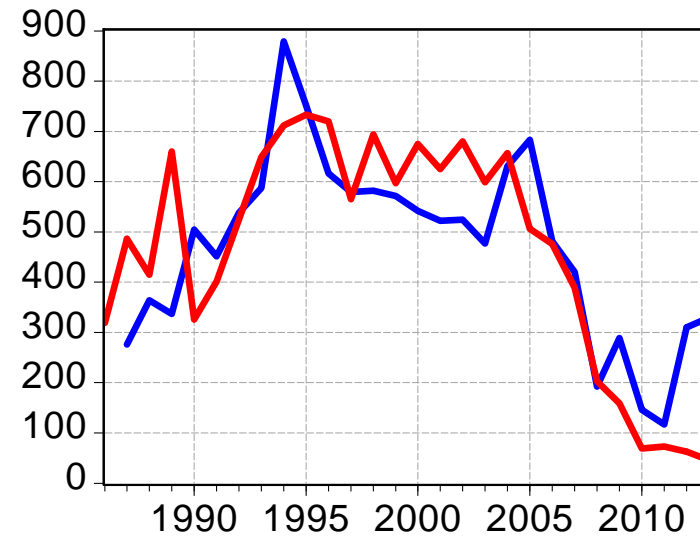


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

sheboygan



Growth in House Prices

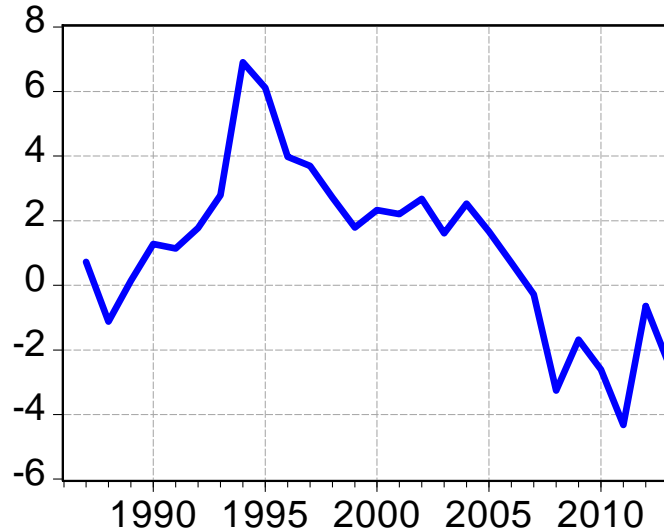


Permits (Red) and Forecast (Blue)

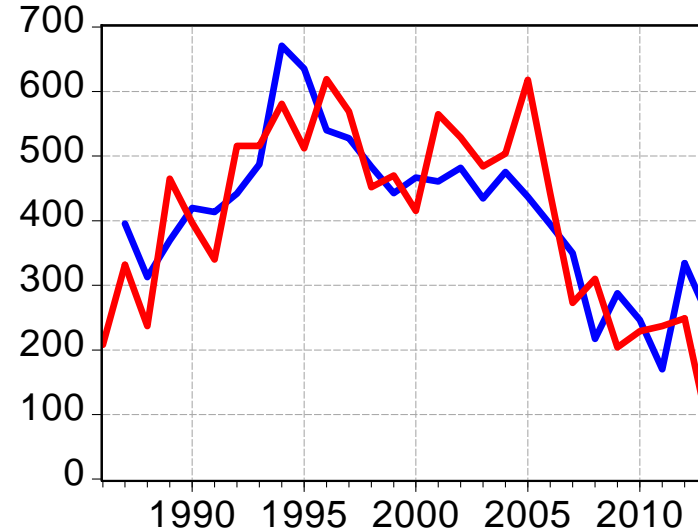


# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

fonddulac



Growth in House Prices



Permits (Red) and Forecast (Blue)





## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Starts equation (R2 of 0.14)

$$\Delta \text{starts}_t = 0.15 * \Delta \text{starts}_{t-1} + 16.4 * \Delta \text{HPgrowth}_{t-1} - 0.13 * \text{error}_{t-1}$$

predicted increase of 98K starts (to 980K) in 2013:Q4

- House Price equation (R2 of 0.12)

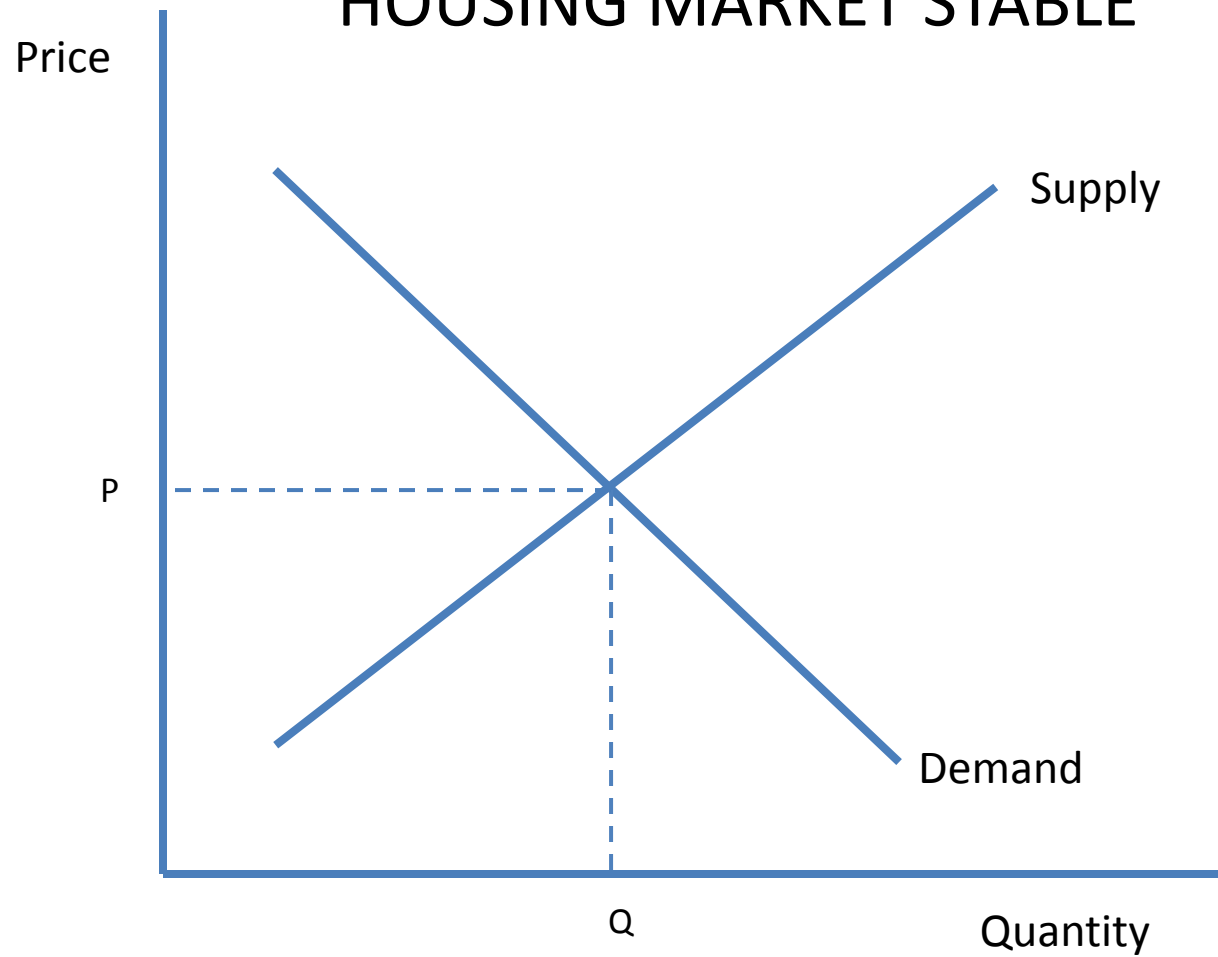
$$\Delta \text{HPgrowth}_t = 0.34 * \Delta \text{HPIgrowth}_{t-1} + 0.0009 * \text{error}_{t-1}$$

predicted decrease of -0.60 Y/Y HP growth. 2.8% for 2013:Q4



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## HOUSING MARKET STABLE



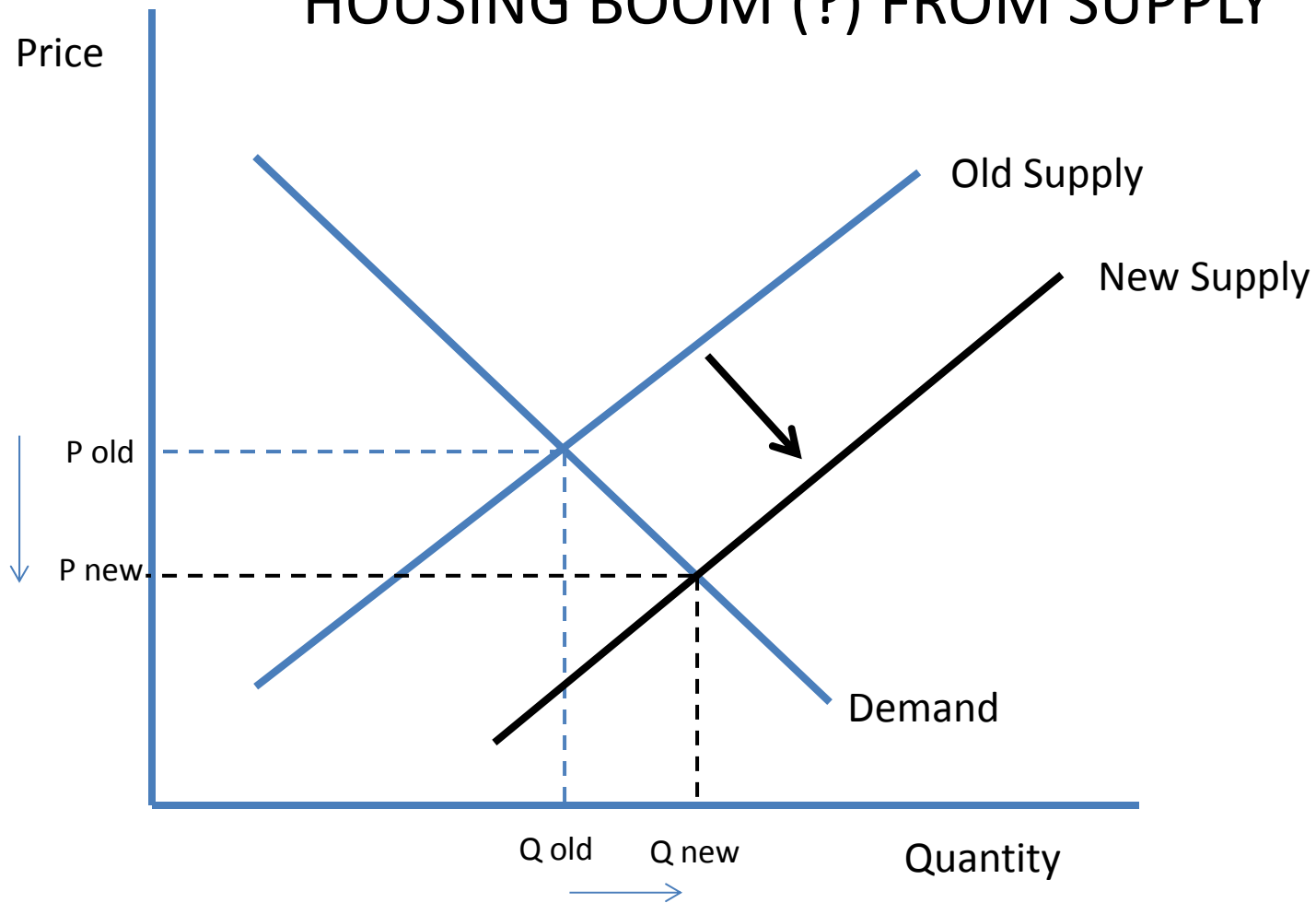


## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Supply shocks: Changes in Price and Quantity are Negatively Correlated



## HOUSING BOOM (?) FROM SUPPLY





## JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

- Demand shocks: Changes in Price and Quantity are Positively Correlated



# JAMES A. GRAASKAMP CENTER FOR REAL ESTATE

## HOUSING BOOM FROM DEMAND

