Evaluating School District Enrollment Changes

Dane County, Wisconsin

Presentation to the

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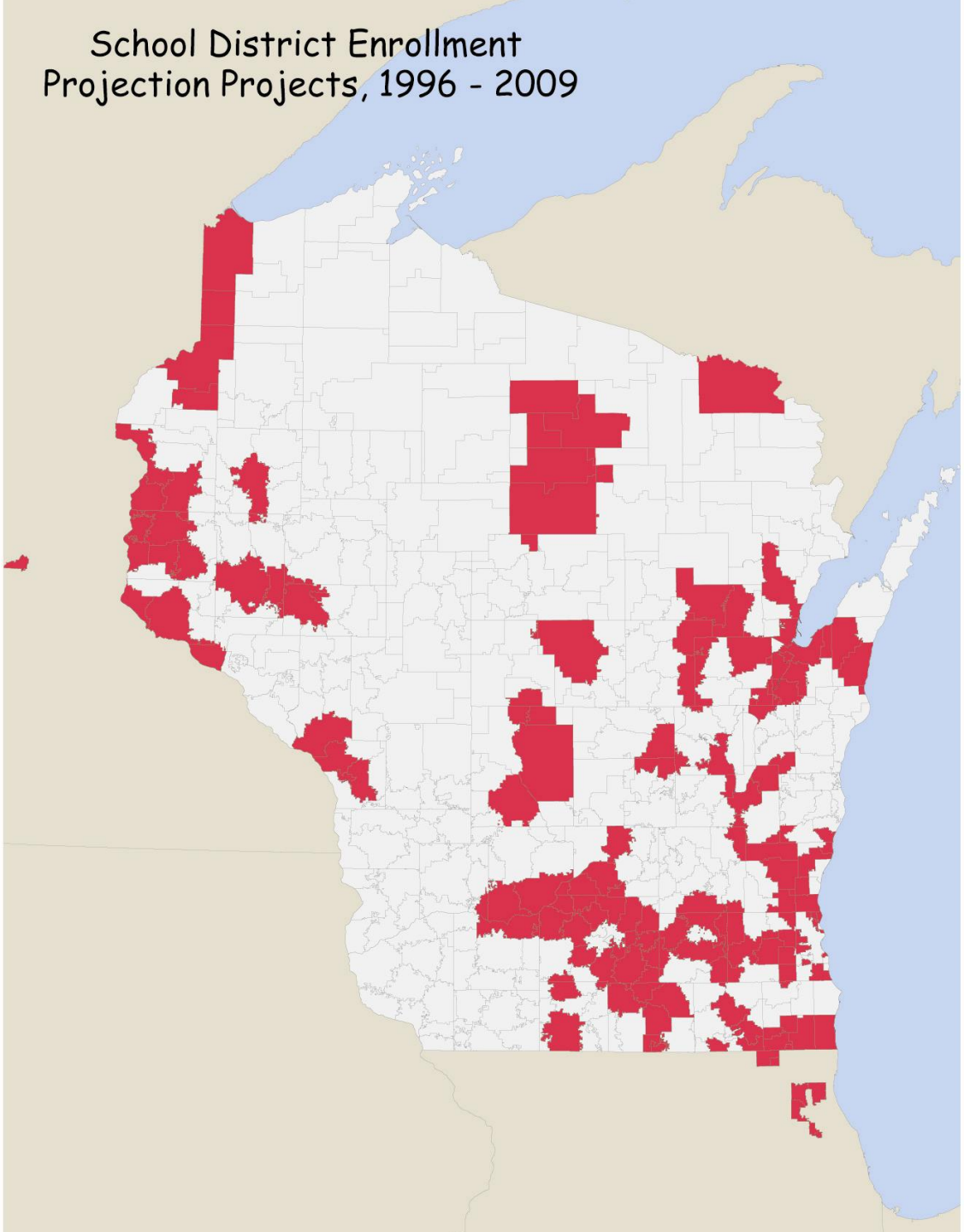
School District Enrollment
Projection Projects, 1996 - 2009

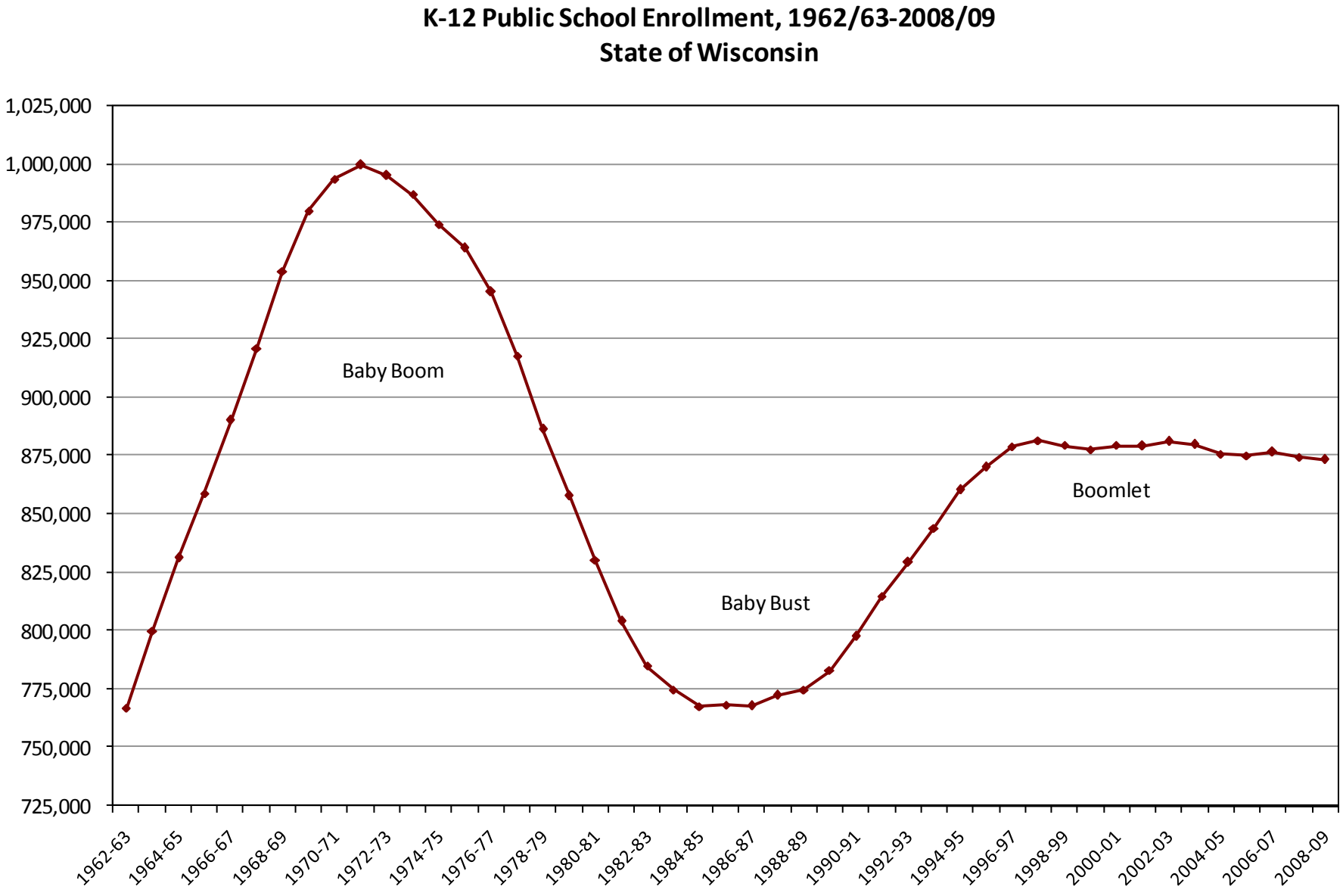


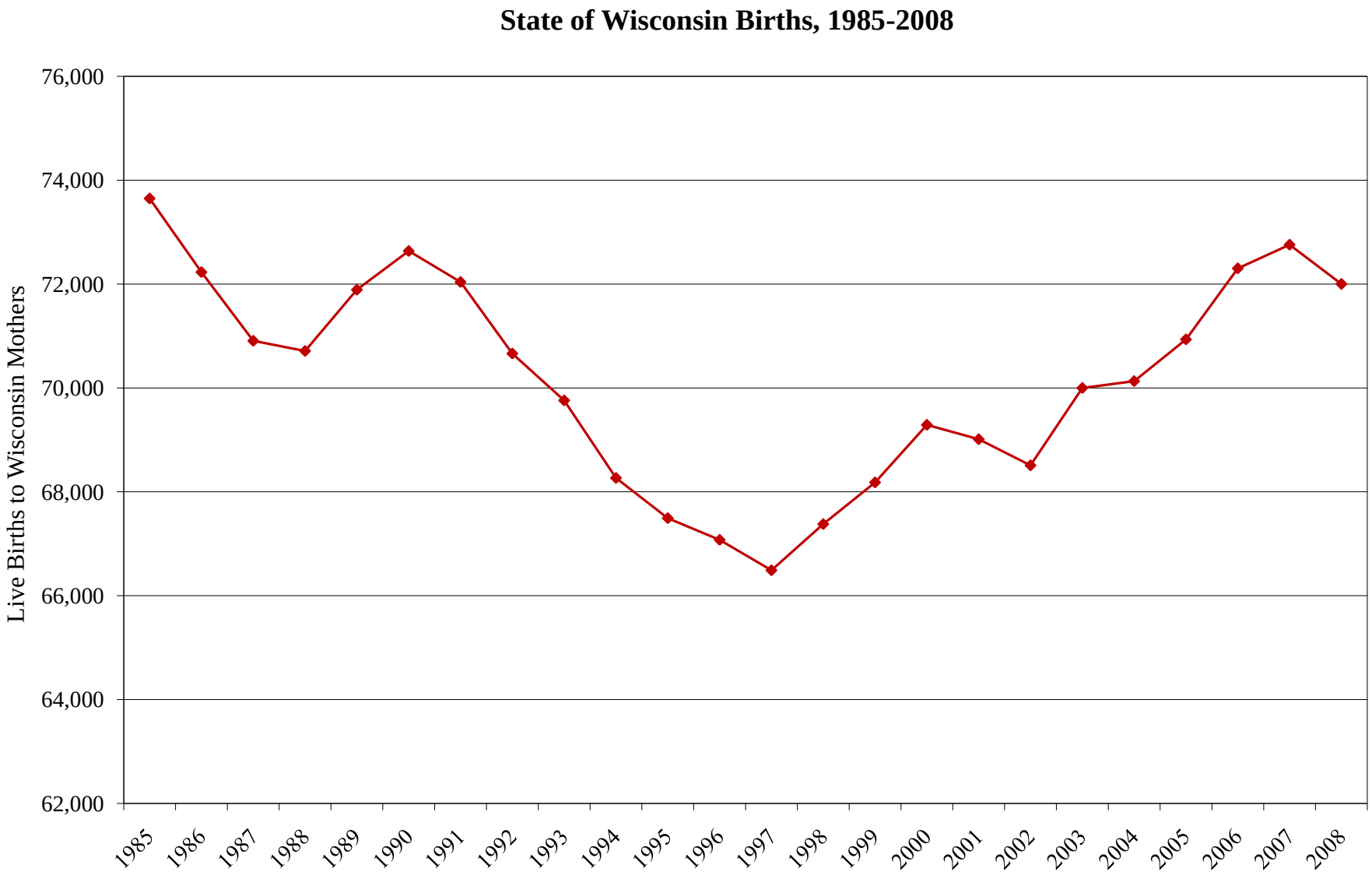
Outline: School Enrollment Changes

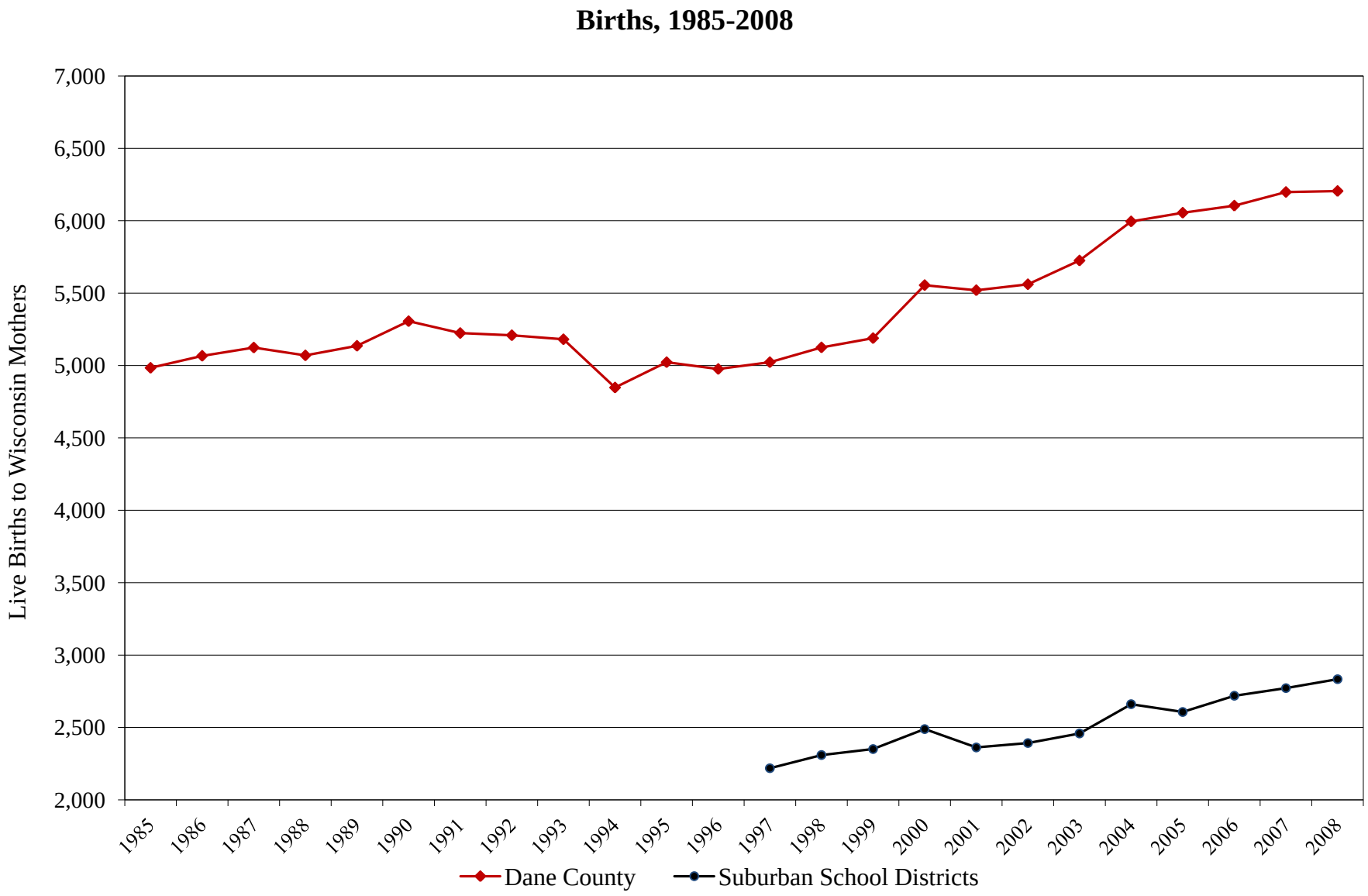
- Background
- Study Area
- Research Questions
- Data & Demographic Factors
- Key Findings
- Future Research
- Summary

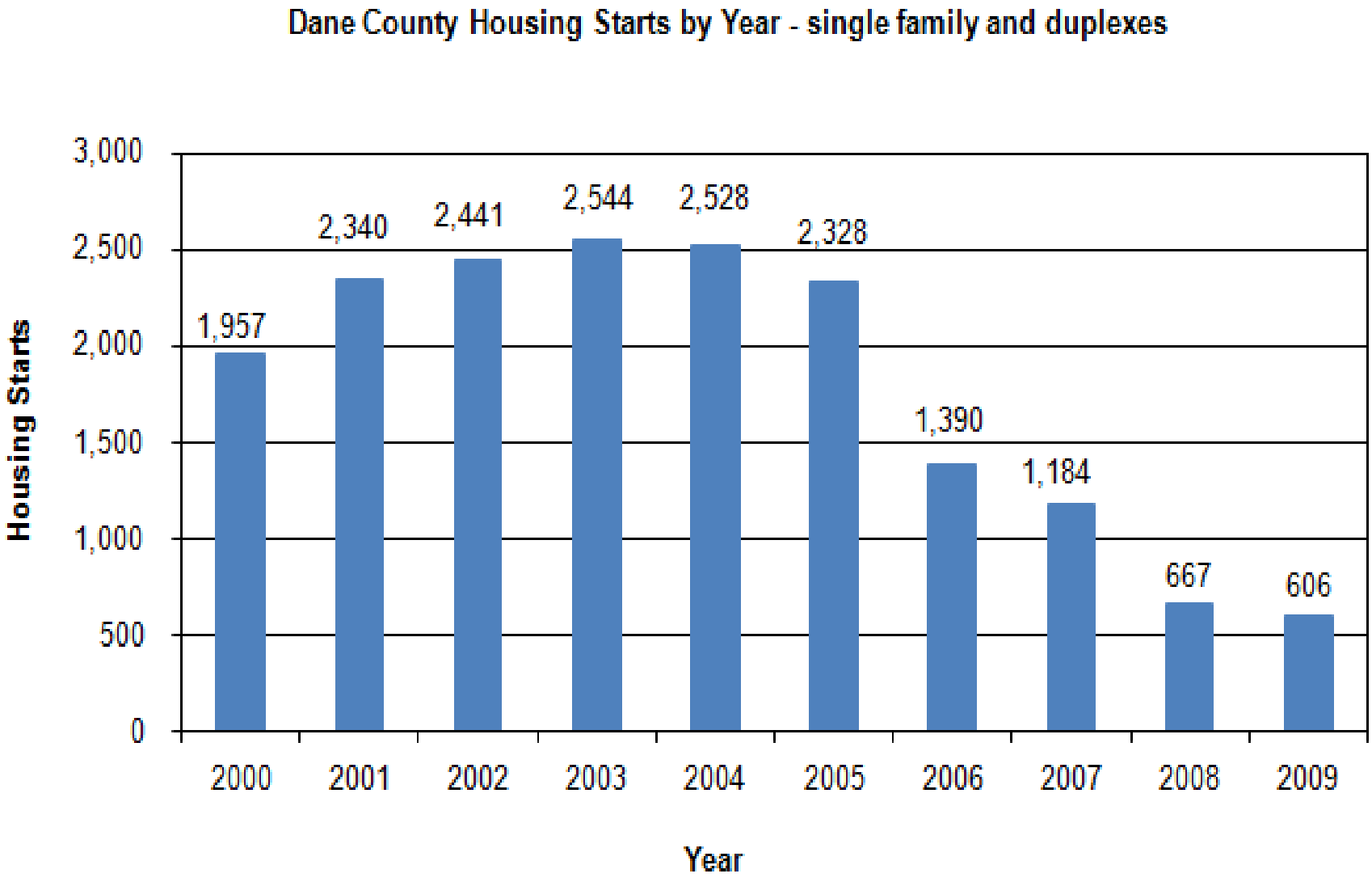
Background: State of Wisconsin & Dane County

- Historical look at Statewide enrollment change
- Historical look at Statewide births
- Historical look at Dane County births
- Historical look at Dane County new housing starts


K-12 Public School Enrollment, 1962/63-2008/09
State of Wisconsin
1,025,000
1,000,000
975,000
950,000
925,000
900,000
875,000
850,000
825,000
800,000
775,000
750,000
725,000
Baby Boom
Baby Bust
Boomlet
1962-63
1964-65
1966-67
1968-69
1970-71
1972-73
1974-75
1976-77
1978-79
1980-81
1982-83
1984-85
1986-87
1988-89
1990-91
1992-93
1994-95
1996-97
1998-99
2000-01
2002-03
2004-05
2006-07
2008-09


State of Wisconsin Births, 1985-2008
Live Births to Wisconsin Mothers
76,000
74,000
72,000
70,000
68,000
66,000
64,000
62,000
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008

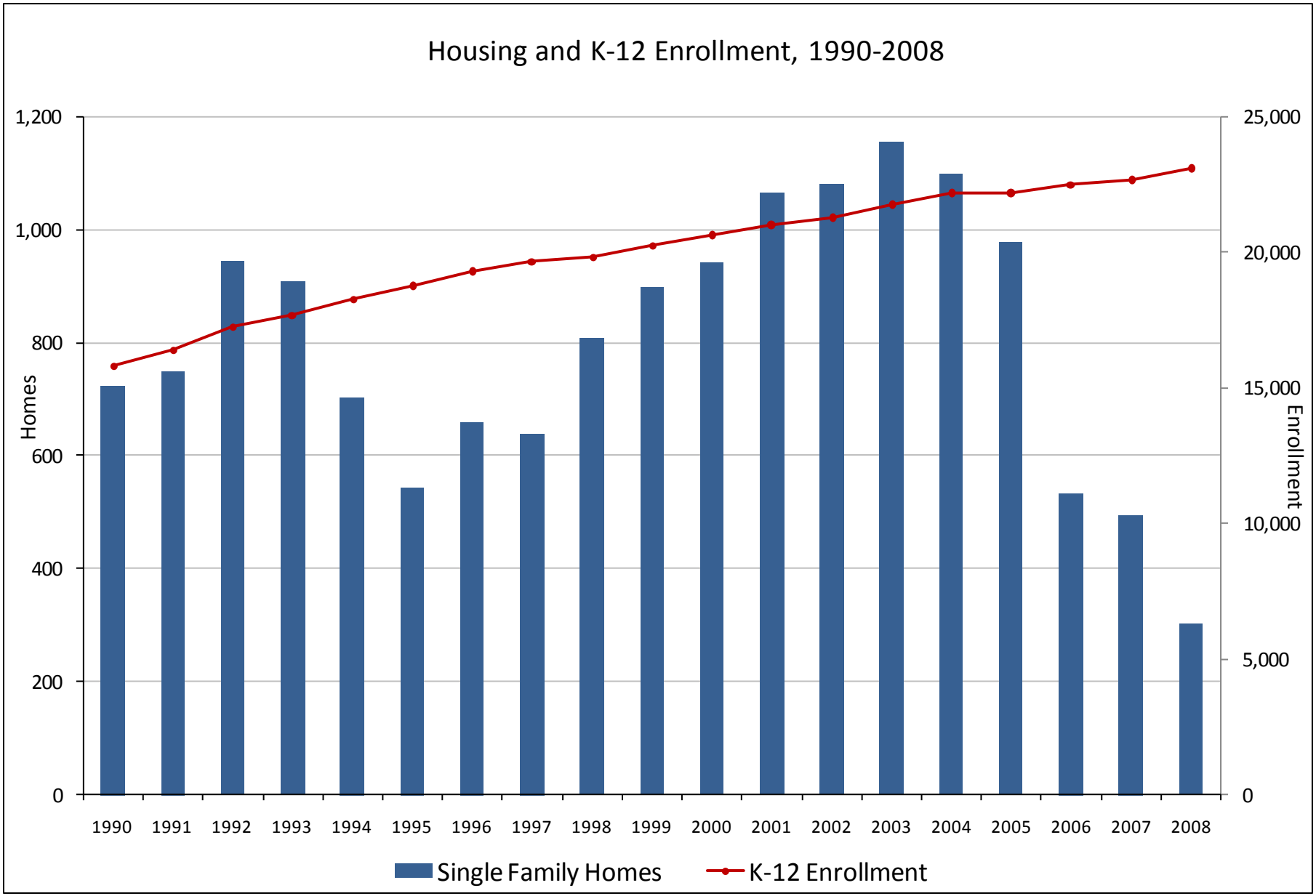

Births, 1985-2008
Live Births to Wisconsin Mothers
7,000
6,500
6,000
5,500
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Dane County
Suburban School Districts

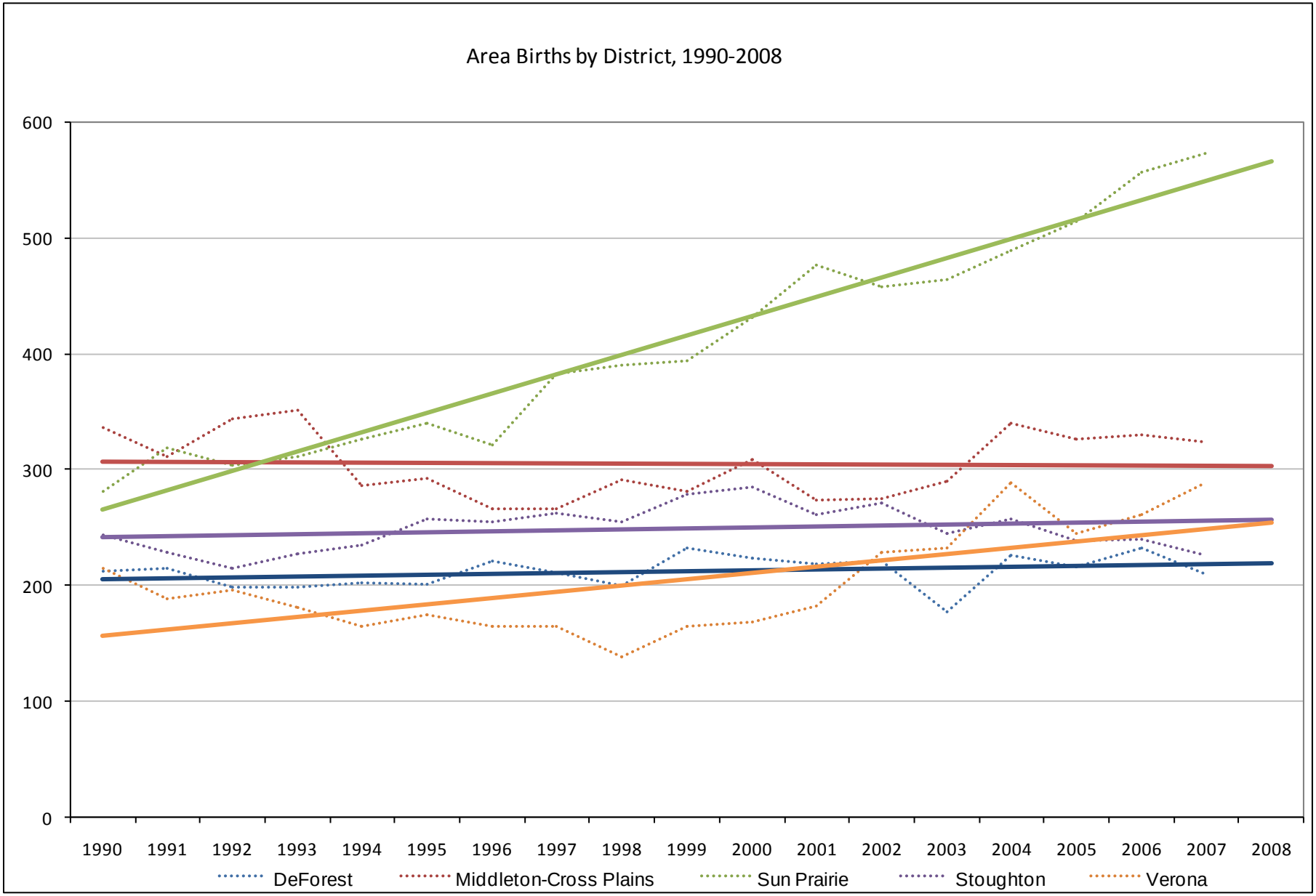


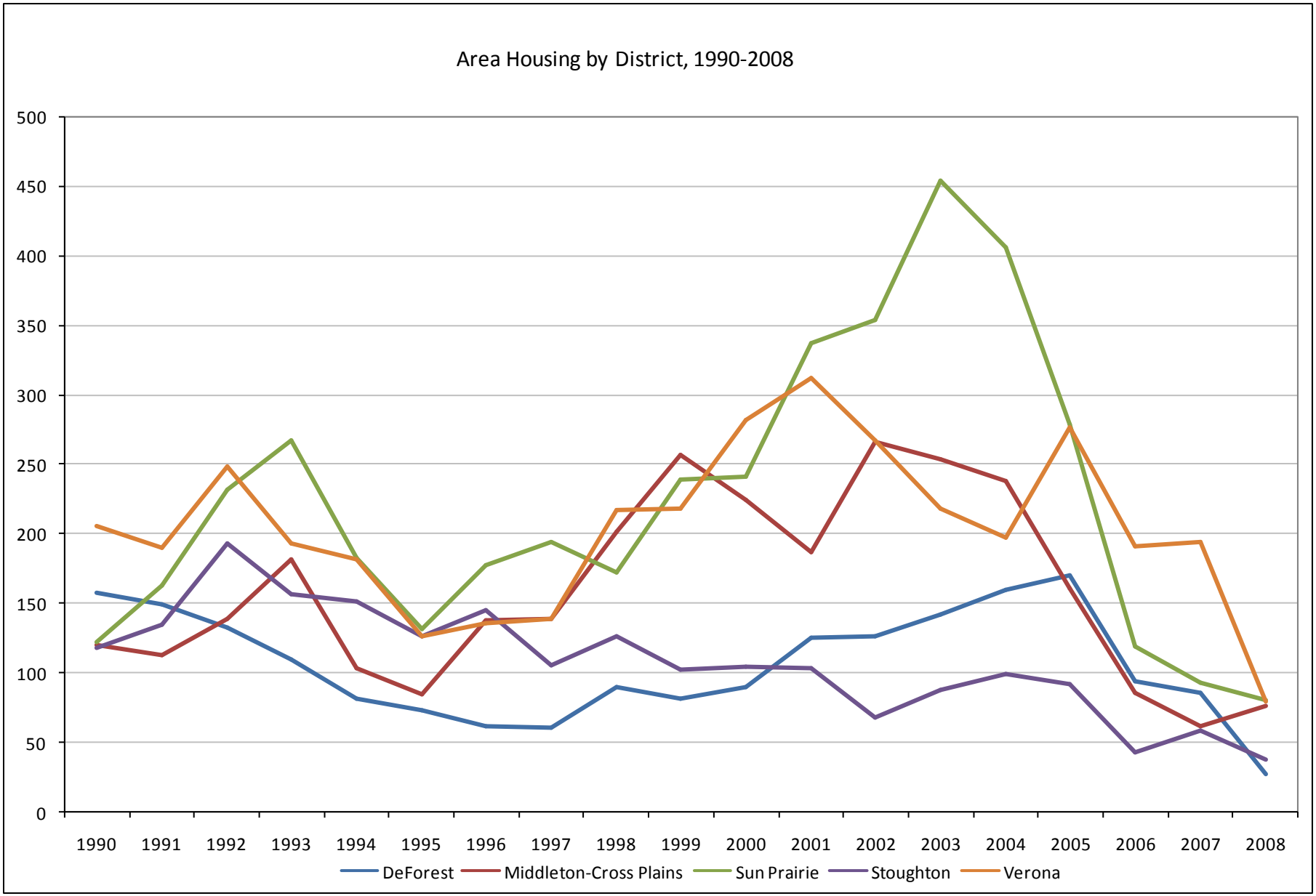
Source: http://danecountymarket.com

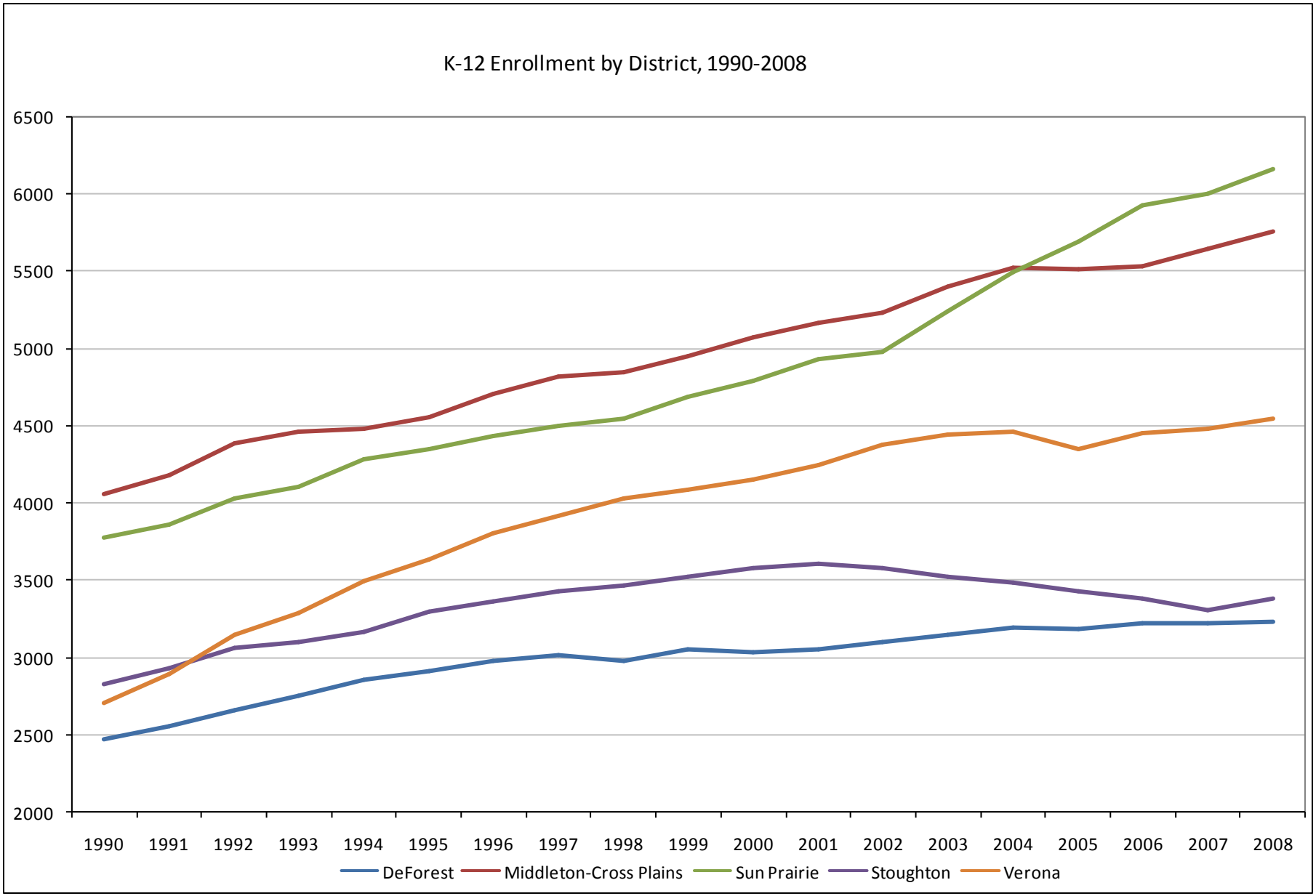
Background: School Districts around Madison

- Use the traditional cohort survival method (B:K ratio) to project enrollment for all school districts.
  - School districts asking what is the impact of new housing on school enrollment.
  - Difficulty in projecting kindergartners in fast growing suburban/exurban districts.
- Housing Unit and Kindergarten Trend models created to provide additional projections for fast growing school districts.


Housing and K-12 Enrollment, 1990-2008
1,200
1,000
800
600
400
200
0
Homes
25,000
20,000
15,000
10,000
5,000
0
Enrollment
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Single Family Homes
K-12 Enrollment


Area Births by District, 1990-2008
600
500
400
300
200
100
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
DeForest
Middleton-Cross Plains
Sun Prairie
Stoughton
Verona

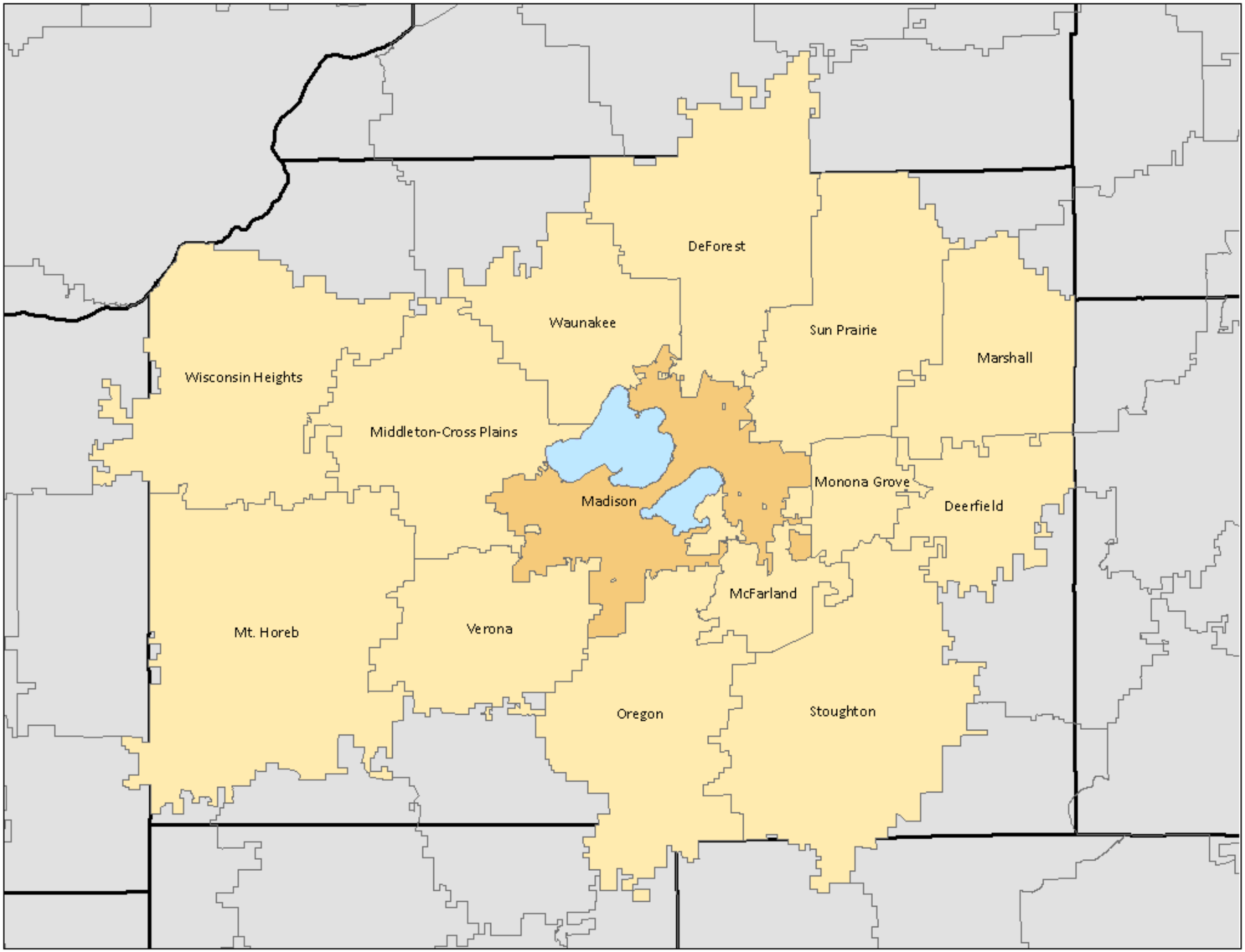

Area Housing by District, 1990-2008
500
450
400
350
300
250
200
150
100
50
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
DeForest
Middleton-Cross Plains
Sun Prairie
Stoughton
Verona


K-12 Enrollment by District, 1990-2008
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
DeForest
Middleton-Cross Plains
Sun Prairie
Stoughton
Verona

Study Area

13 School Districts in Dane County, Wisconsin

- Deerfield
- DeForest
- Marshall
- McFarland
- Middleton-Cross Plains
- Monona Grove
- Mount Horeb
- Oregon
- Stoughton
- Sun Prairie
- Verona
- Waunakee
- Wisconsin Heights


DeForest
Waunakee
Sun Prairie
Marshall
Wisconsin Heights
Middleton-Cross Plains
Madison
Monona Grove
Deerfield
McFarland
Mt. Horeb
Verona
Oregon
Stoughton

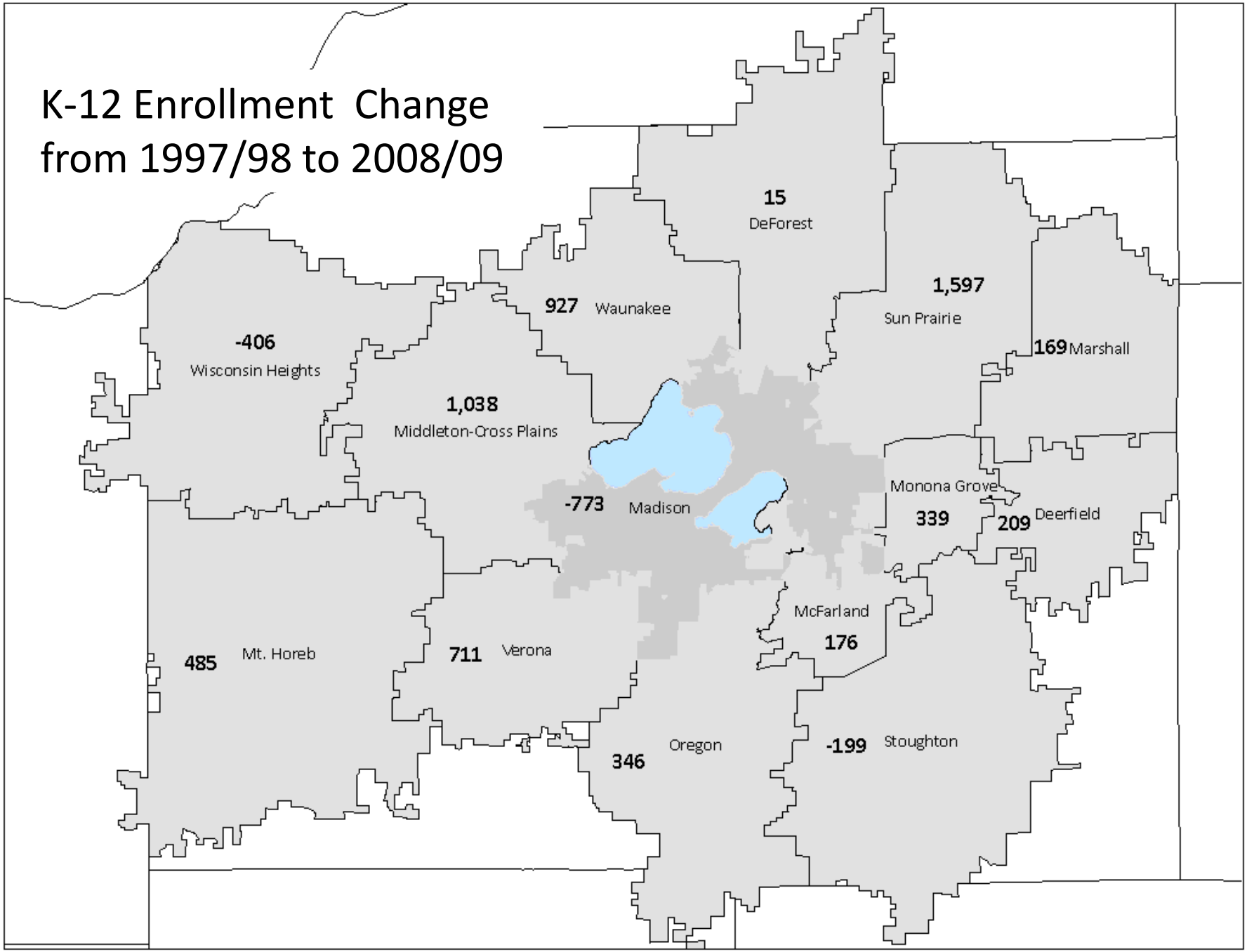
Effect of Housing on Enrollment

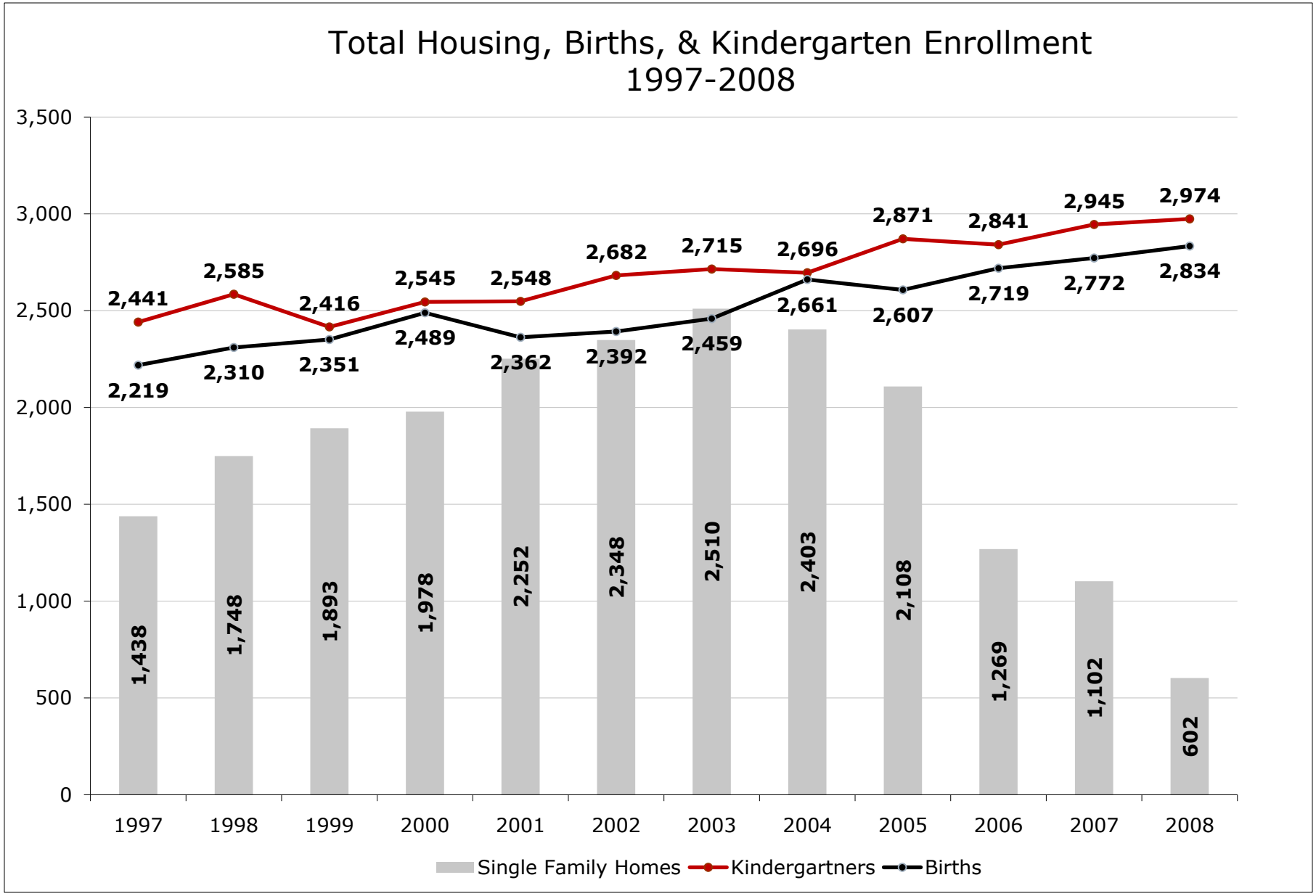
What demographic factors influence kindergarten enrollment?

Do new single-family homes attract younger families and impact kindergarten enrollment immediately or does a lag effect occur?

Enrollment, Births, & Housing

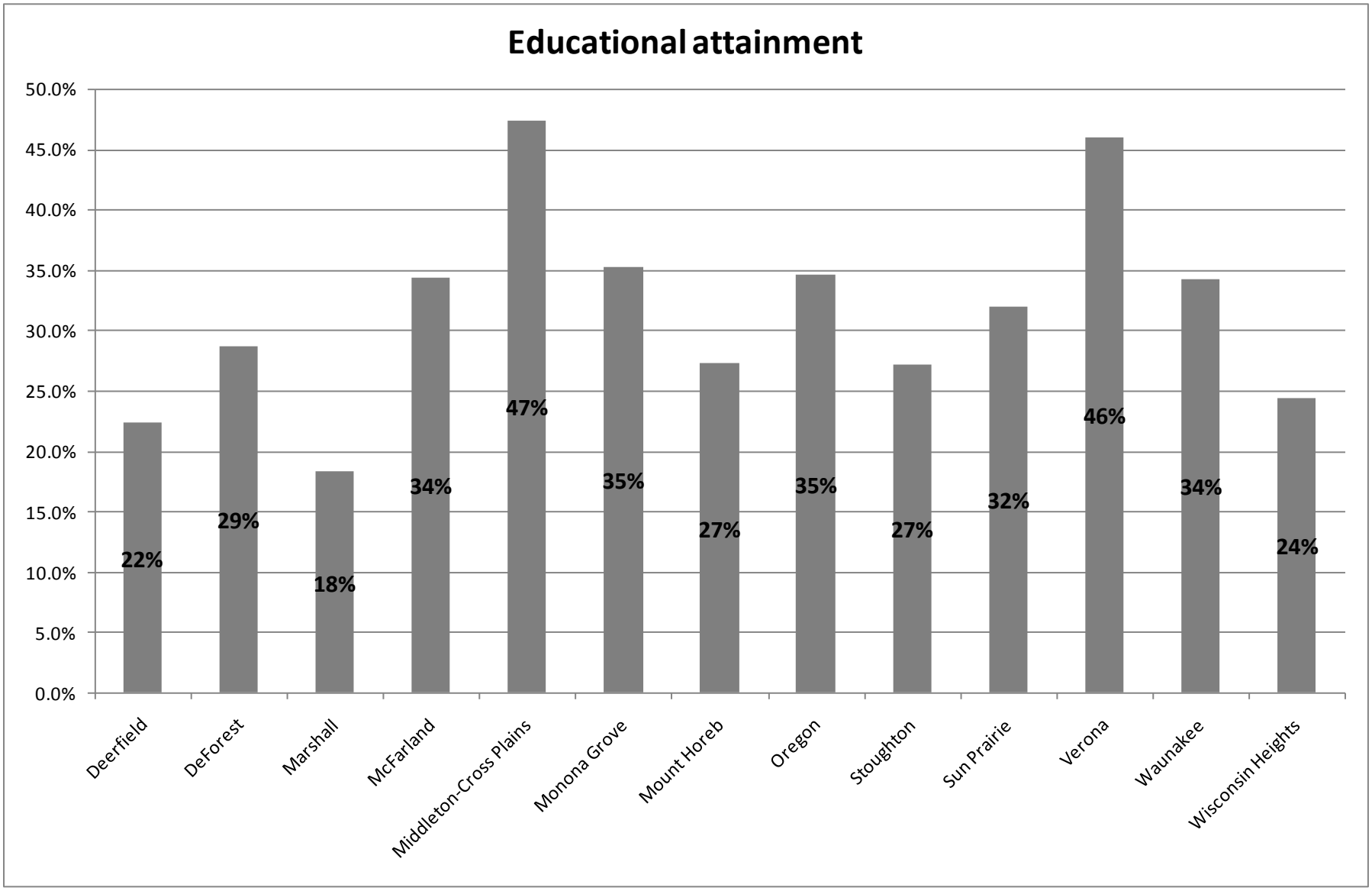
- School enrollment (kindergarten), 97/98–08/09
- Single family housing, 1997-2008
- Municipal births divided by district, 1997-2008


K-12 Enrollment Change
from 1997/98 to 2008/09
15
DeForest
927
Waunakee
1,597
Sun Prairie
-406
Wisconsin Heights
169
Marshall
1,038
Middleton-Cross Plains
-773
Madison
Monona Grove
339
209
Deerfield
McFarland
176
485
Mt. Horeb
711
Verona
346
Oregon
-199
Stoughton

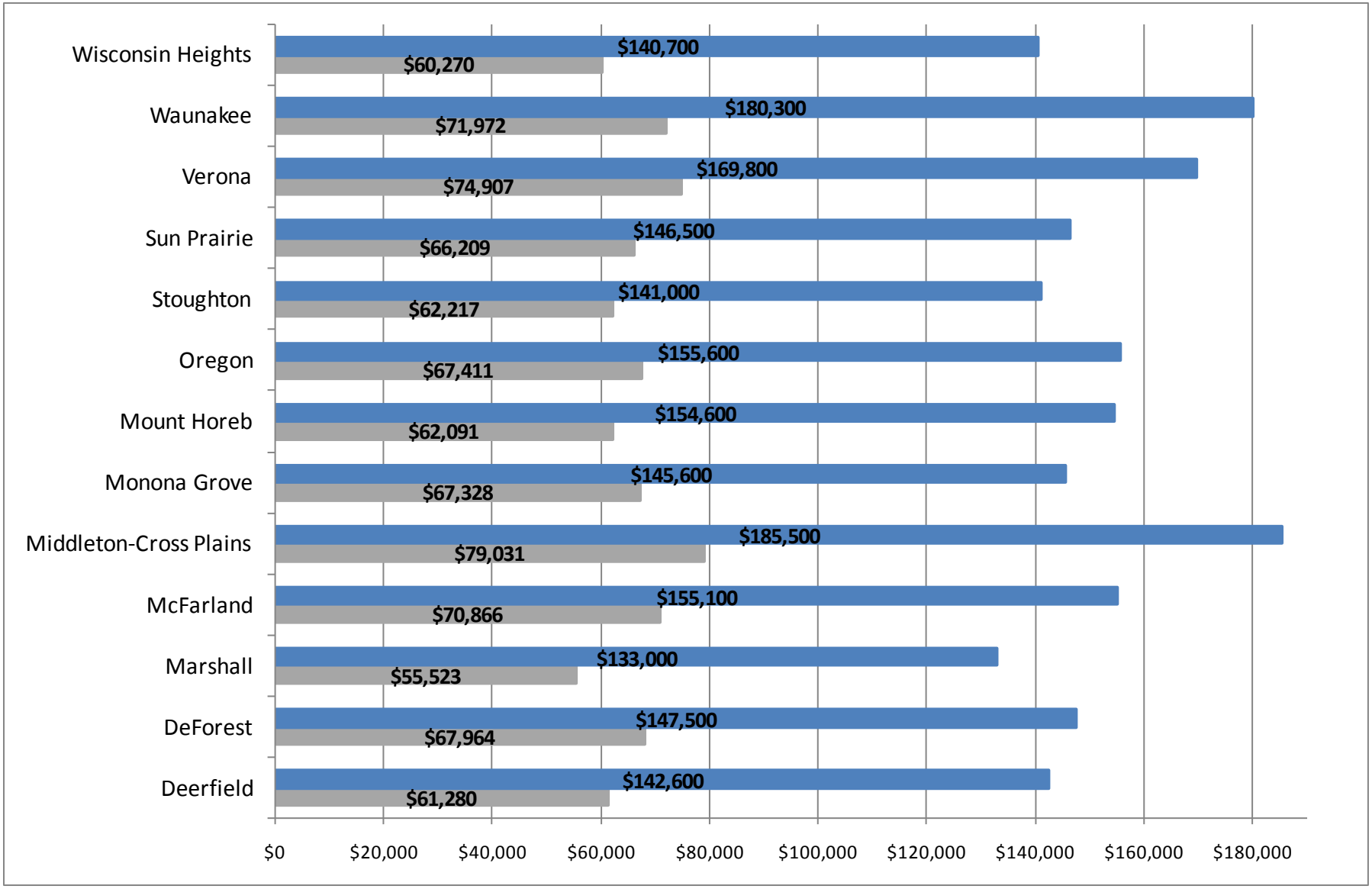

Total Housing, Births, & Kindergarten Enrollment
1997-2008
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2,441
2,585
2,416
2,545
2,548
2,682
2,715
2,696
2,871
2,841
2,945
2,974
2,219
2,310
2,351
2,489
2,362
2,392
2,459
2,661
2,607
2,719
2,772
2,834
1,438
1,748
1,893
1,978
2,252
2,348
2,510
2,403
2,108
1,269
1,102
602
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Single Family Homes
Kindergartners
Births

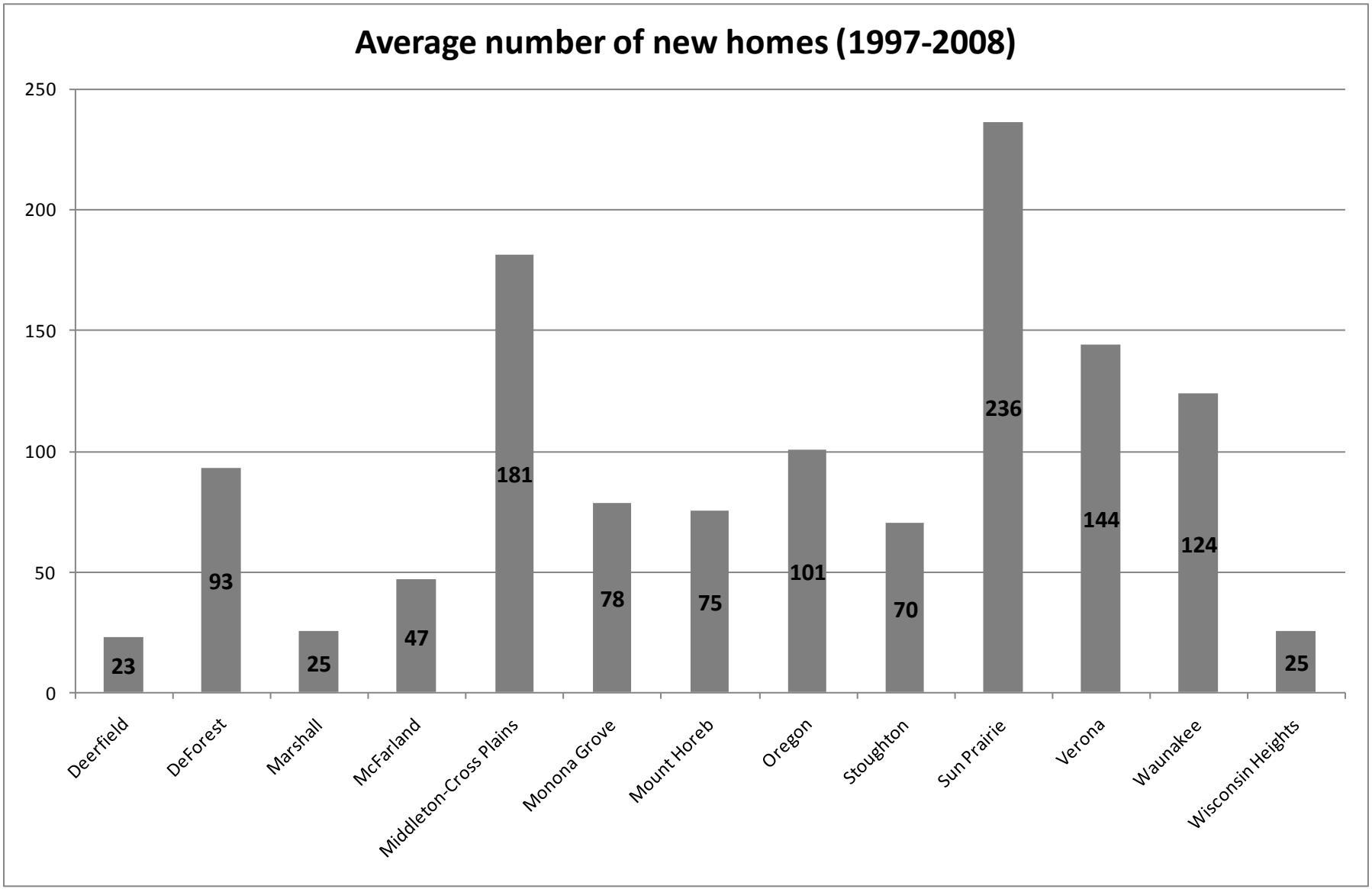
Demographic Factors

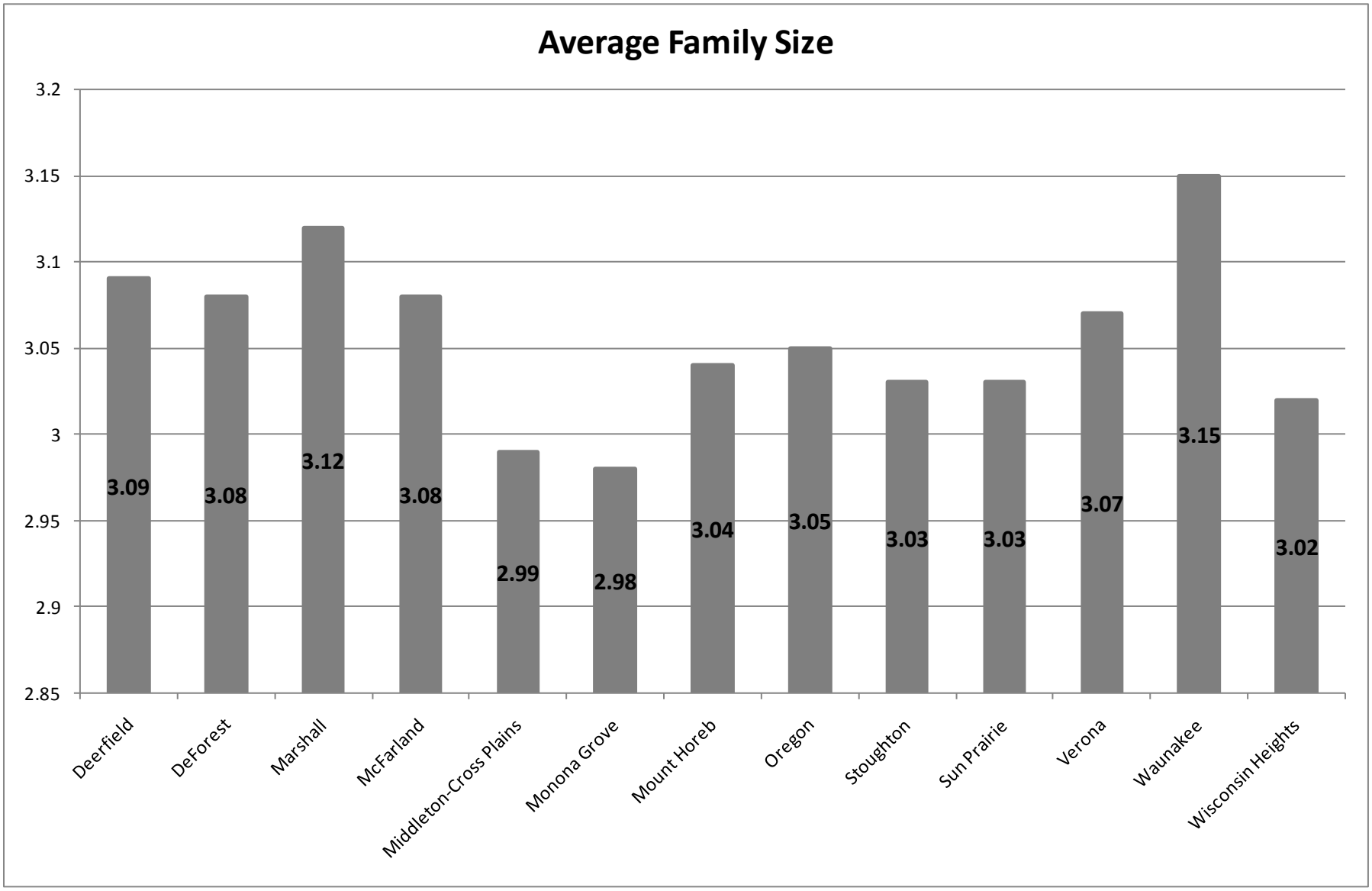
- ✓ Educational attainment
- ✓ Median household income
- ✓ Median home value
- ✓ Average number of new homes
- ✓ Average family size
- ✓ Percent non-Hispanic white
- ✓ Distance to the City of Madison
- ✓ Open enrollment

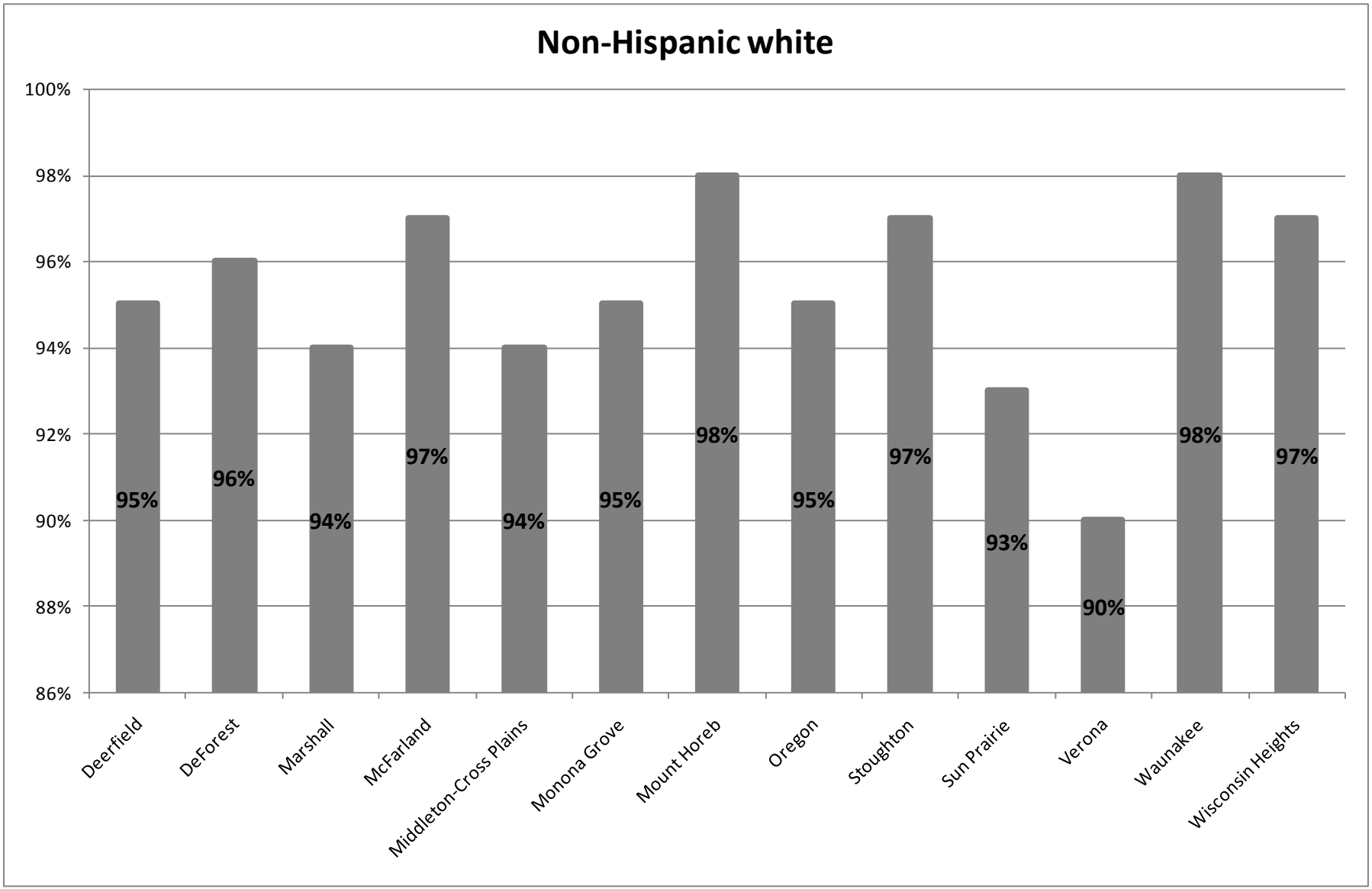

Educational attainment
50.0%
45.0%
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
22%
29%
18%
34%
47%
35%
27%
35%
27%
32%
46%
34%
24%
Deerfield
DeForest
Marshall
McFarland
Middleton-Cross Plains
Monona Grove
Mount Horeb
Oregon
Stoughton
Sun Prairie
Verona
Waunakee
Wisconsin Heights

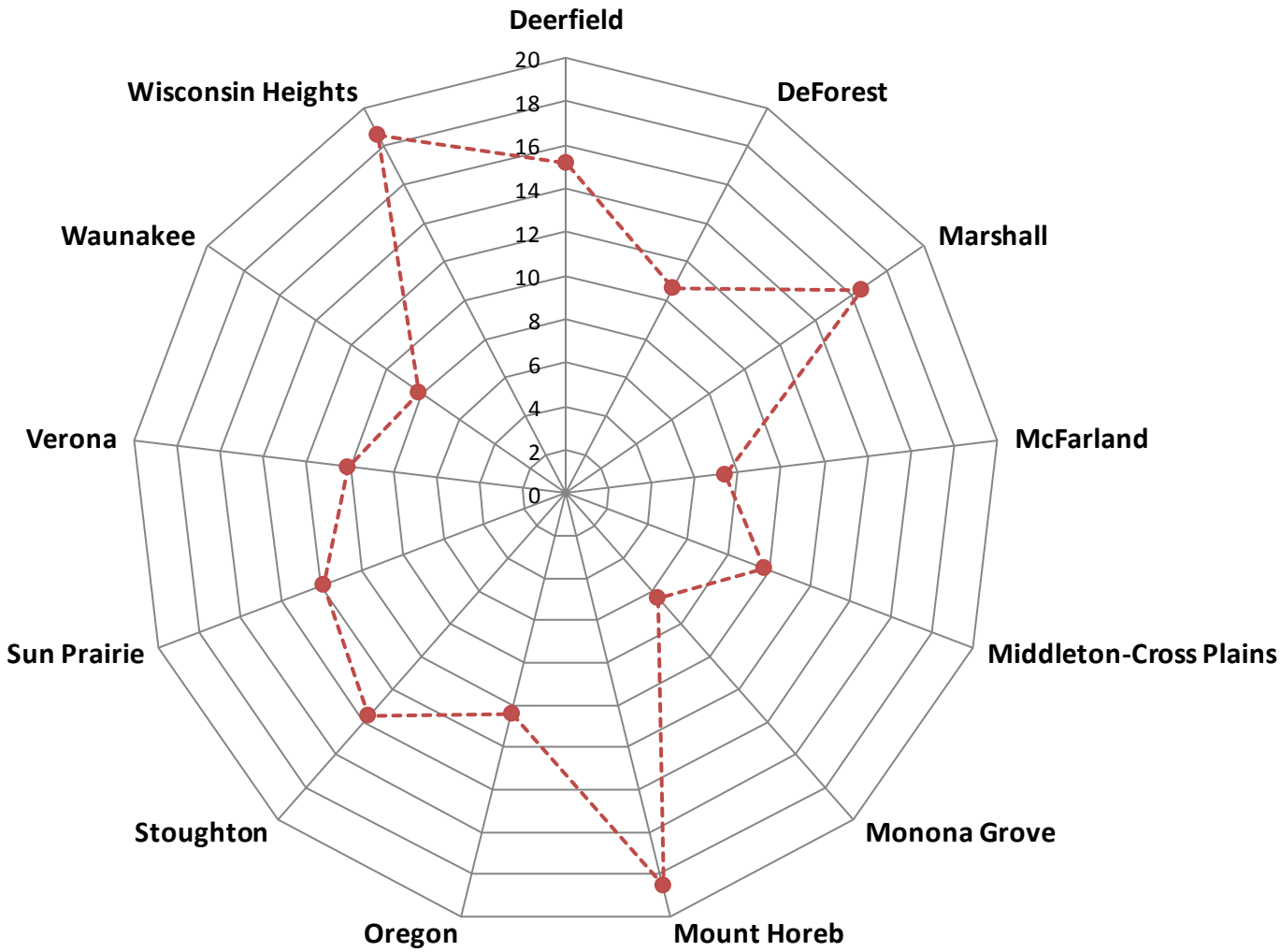
Median household income and home value



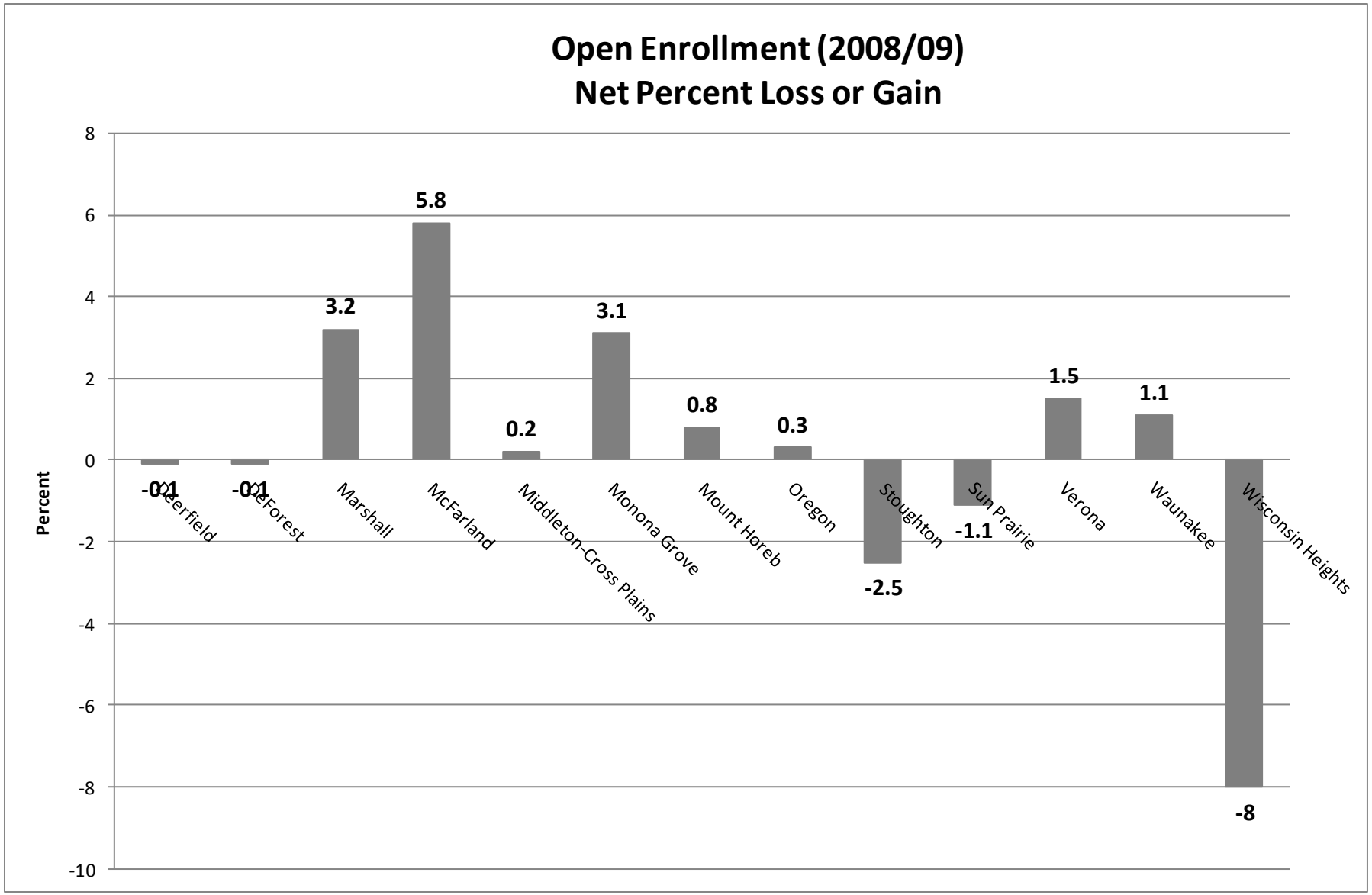

Average number of new homes (1997-2008)
250
200
150
100
50
0
23
93
25
47
181
78
75
101
70
236
144
124
25
Deerfield
DeForest
Marshall
McFarland
Middleton-Cross Plains
Monona Grove
Mount Horeb
Oregon
Stoughton
Sun Prairie
Verona
Waunakee
Wisconsin Heights


Average Family Size
3.2
3.15
3.1
3.05
3
2.95
2.9
2.85
3.09
3.08
3.12
3.08
2.99
2.98
3.04
3.05
3.03
3.03
3.07
3.15
3.02
Deerfield
DeForest
Marshall
McFarland
Middleton-Cross Plains
Monona Grove
Mount Horeb
Oregon
Stoughton
Sun Prairie
Verona
Waunakee
Wisconsin Heights


Non-Hispanic white
100%
98%
96%
94%
92%
90%
88%
86%
95%
96%
94%
97%
94%
95%
98%
95%
97%
93%
90%
98%
97%
Deerfield
DeForest
Marshall
McFarland
Middleton-Cross Plains
Monona Grove
Mount Horeb
Oregon
Stoughton
Sun Prairie
Verona
Waunakee
Wisconsin Heights



Distance to City of Madison (In Miles)


Open Enrollment (2008/09)
Net Percent Loss or Gain
Percent
8
6
4
2
0
-2
-4
-6
-8
-10
-0.1
-0.1
3.2
5.8
0.2
3.1
0.8
0.3
-2.5
-1.1
1.5
1.1
-8
Deerfield
DeForest
Marshall
McFarland
Middleton-Cross Plains
Monona Grove
Mount Horeb
Oregon
Stoughton
Sun Prairie
Verona
Waunakee
Wisconsin Heights

Key Findings: Births & Kindergarten

- Strong predictors: educational attainment, median home value, & median household income
- Weak predictors: percent non-Hispanic white, average number of new homes, & family size

Kindergarten Enrollment		
	adj R2	**Coef.**
births 5 years	0.84	1.00
ed attainment	0.91	0.92
med home value	0.91	0.96
med income	0.90	0.96
percent white	0.85	0.98
ave new housing	0.84	0.98
ave family size	0.83	1.00

Key Findings: Influence of New Housing

After lagging the effects of housing. . .

Births

	adj R2	Coef.
housing	0.5209	1.0826
lag 1	0.6228	1.2425
lag 2	0.7062	1.3584
lag 3	0.7830	1.4384
lag 4	0.7939	1.4626
lag 5	0.7728	1.5417
lag 6	0.7765	1.7538

Kindergarten Enrollment

	adj R2	Coef.
housing	0.6083	0.6372
lag 1	0.6668	0.6652
lag 2	0.7684	0.8179
lag 3	0.8294	0.7183
lag 4	0.8156	0.5943
lag 5	0.7865	0.4764
lag 6	0.7923	0.2596

Key Findings: Summary

- Some demographic variables were stronger predictors of kindergarten enrollment than others.
- While median home value was a strong predictor, the average number of new homes was a weak predictor.
- The impact of new housing on births peaked in year 4 while the impact of new housing on kindergarten enrollment peaked in year 3.
- Results indicate that both families with small children and families with children not yet born moved into new housing.

Future Research Topics

- Expand analysis - lagged births and kindergarten enrollment and include analysis of other grade levels.
- Spatial analysis - what affect does distance from the "city center" of Madison have on school enrollment.
- Enlarge study area to include other suburban areas in the State of Wisconsin (Waukesha County, Minneapolis metro area, Fox Valley/ Green Bay area).

Summary

Combing the knowledge from past projects with school districts around the City of Madison and this current research . . .

- The cohort survival method utilizing births under projected while the housing unit model utilizing new single family homes over projected.
- Housing did not have as great of an impact as anticipated although the districts that did see increased housing saw increased enrollment.
- It is likely that a slowing of new housing will mean a slowing of enrollment although a lag effect will occur.

Thank You!

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