Evaluating School District Enrollment Changes

Dane County, Wisconsin

Presentation to the
89th Wisconsin State Education Convention
January 20, 2010

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Applied Population Laboratory

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  - Experts in GIS, Data Provision, Community Studies, & Demographic Methods
- Data providers
  - State Data Center for US Census Bureau
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- Small area population estimates and projections
  - School Enrollment Projections

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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
Dane County Housing Starts by Year - single family and duplexes

Year | Housing Starts
--- | ---
2000 | 1,957
2001 | 2,340
2002 | 2,441
2003 | 2,544
2004 | 2,528
2005 | 2,328
2006 | 1,390
2007 | 1,184
2008 | 667
2009 | 606

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

- **Single Family Homes**
- **K-12 Enrollment**

Data for **Housing and K-12 Enrollment, 1990-2008** is presented. The graph shows the trend of enrollment and homes from 1990 to 2008.
Area Births by District, 1990-2008

DeForest  Middleton  Cross Plains  Sun Prairie  Stoughton  Verona

Area Births by District, 1990-2008
K-12 Enrollment by District, 1990-2008

- DeForest
- Middleton-Cross Plains
- Sun Prairie
- Stoughton
- Verona

Graph showing enrollment trends from 1990 to 2008.
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
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
Total Housing, Births, & Kindergarten Enrollment 1997-2008

- **Single Family Homes**
- **Kindergartners**
- **Births**

Data for the years 1997 to 2008 is shown, with a trend line for each category illustrating the increase in numbers over the specified period.
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
### Median household income and home value

<table>
<thead>
<tr>
<th>Location</th>
<th>Median Household Income</th>
<th>Median Home Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Heights</td>
<td>$60,270</td>
<td>$140,700</td>
</tr>
<tr>
<td>Waunakee</td>
<td>$71,972</td>
<td>$180,300</td>
</tr>
<tr>
<td>Verona</td>
<td>$74,907</td>
<td>$169,800</td>
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<tr>
<td>Sun Prairie</td>
<td>$66,209</td>
<td>$146,500</td>
</tr>
<tr>
<td>Stoughton</td>
<td>$62,217</td>
<td>$141,000</td>
</tr>
<tr>
<td>Oregon</td>
<td>$67,411</td>
<td>$155,600</td>
</tr>
<tr>
<td>Mount Horeb</td>
<td>$62,091</td>
<td>$154,600</td>
</tr>
<tr>
<td>Monona Grove</td>
<td>$67,328</td>
<td>$145,600</td>
</tr>
<tr>
<td>Middleton-Cross Plains</td>
<td>$79,031</td>
<td>$185,500</td>
</tr>
<tr>
<td>McFarland</td>
<td>$70,866</td>
<td>$155,100</td>
</tr>
<tr>
<td>Marshall</td>
<td>$55,523</td>
<td>$133,000</td>
</tr>
<tr>
<td>DeForest</td>
<td>$67,964</td>
<td>$147,500</td>
</tr>
<tr>
<td>Deerfield</td>
<td>$61,280</td>
<td>$142,600</td>
</tr>
</tbody>
</table>
Average number of new homes (1997-2008)
Average Family Size

Deerfield: 3.09
DeForest: 3.08
Marshall: 3.12
Mcfarland: 3.08
Middleton-Cross Plains: 2.99
Monona Grove: 2.98
Mount Horeb: 3.04
Oregon: 3.05
Stoughton: 3.03
Sun Prairie: 3.03
Verona: 3.07
Waunakee: 3.15
Wisconsin Heights: 3.02
Distance to City of Madison (In Miles)
Open Enrollment (2008/09)
Net Percent Loss or Gain

Percent
Open Enrollment (2008/09)
Net Percent Loss or Gain
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

<table>
<thead>
<tr>
<th>Kindergarten Enrollment</th>
<th>adj R2</th>
<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>births 5 years</td>
<td>0.84</td>
<td>1.00</td>
</tr>
<tr>
<td>ed attainment</td>
<td>0.91</td>
<td>0.92</td>
</tr>
<tr>
<td>med home value</td>
<td>0.91</td>
<td>0.96</td>
</tr>
<tr>
<td>med income</td>
<td>0.90</td>
<td>0.96</td>
</tr>
<tr>
<td>percent white</td>
<td>0.85</td>
<td>0.98</td>
</tr>
<tr>
<td>ave new housing</td>
<td>0.84</td>
<td>0.98</td>
</tr>
<tr>
<td>ave family size</td>
<td>0.83</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Key Findings: Influence of New Housing

After lagging the effects of housing...

### Births

<table>
<thead>
<tr>
<th></th>
<th>adj R2</th>
<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>housing</td>
<td>0.5209</td>
<td>1.0826</td>
</tr>
<tr>
<td>lag 1</td>
<td>0.6228</td>
<td>1.2425</td>
</tr>
<tr>
<td>lag 2</td>
<td>0.7062</td>
<td>1.3584</td>
</tr>
<tr>
<td>lag 3</td>
<td>0.7830</td>
<td>1.4384</td>
</tr>
<tr>
<td>lag 4</td>
<td>0.7939</td>
<td>1.4626</td>
</tr>
<tr>
<td>lag 5</td>
<td>0.7728</td>
<td>1.5417</td>
</tr>
<tr>
<td>lag 6</td>
<td>0.7765</td>
<td>1.7538</td>
</tr>
</tbody>
</table>

### Kindergarten Enrollment

<table>
<thead>
<tr>
<th></th>
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<th>Coef.</th>
</tr>
</thead>
<tbody>
<tr>
<td>housing</td>
<td>0.6083</td>
<td>0.6372</td>
</tr>
<tr>
<td>lag 1</td>
<td>0.6668</td>
<td>0.6652</td>
</tr>
<tr>
<td>lag 2</td>
<td>0.7684</td>
<td>0.8179</td>
</tr>
<tr>
<td>lag 3</td>
<td>0.8294</td>
<td>0.7183</td>
</tr>
<tr>
<td>lag 4</td>
<td>0.8156</td>
<td>0.5943</td>
</tr>
<tr>
<td>lag 5</td>
<td>0.7865</td>
<td>0.4764</td>
</tr>
<tr>
<td>lag 6</td>
<td>0.7923</td>
<td>0.2596</td>
</tr>
</tbody>
</table>
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.

School District Enrollment Changes, Dane County
Thank You!

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