Salaries of Kentucky public school teachers through time: a novel statewide individual-level dataset

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Acknowledgments

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Background and relevance

• Importance for Kentucky/Appalachian policy issues…
  – Teacher compensation is a dominant feature of district budgets
  – Administrative data offer some advantages over individual-level survey data in national datasets
  – Scope of final dataset will permit hypothesis testing in a variety of current areas of research
Dataset

• Administrative data from KDE, assembled by districts and submitted annually to the state

• Combined with data from other sources (NCES, Census, KY Workforce)
Dataset

- Teacher-level (2000/1-2005/6 for pilot work)
  - salary (by type of duties)
  - age
  - gender
  - ethnicity
  - years of experience
  - rank
  - content area of teaching, including math or science fields
  - degree(s) completed
  - location(s) of training
  - certificates held, including emergency
  - year of certification
  - score on teacher entrance exams
  - score on ACT exams (for recent graduates of Kentucky institutions of higher education)
Examples of research topics

• What variability exists across Kentucky districts in teacher compensation?
  – Is there a salary gap between Appalachian and non-Appalachian teachers?

• Wage differentials within Kentucky between teachers and other workers: where is teaching a more attractive occupational choice?
Variability by region: Ranks 1, 2, 3 by ADD

Non-Appal.
- LOUISVILLE
- NORTHERN KENTUCKY
- LINCOLN TRAIL
- GREEN RIVER
- BLUEGRASS
- PURCHASE
- PENNYRIE
- BARREN RIVER

Appal.
- BIGSANDY
- FIVCO
- KENTUCKY RIVER
- BUFFALOTRACE GATEWAY
- CUMBERLAND VALLEY
- LAKE CUMBERLAND

mean of teachsalary

- 25,000
- 30,000
- 35,000
- 40,000
- 45,000
- 50,000
- 55,000
Teaching salary: regional gap?

- Mean (Appal.): $ 41,405 (9,661 teachers)
- Mean (Non-Appal.): $ 42,956 (21,358 teachers)
Teaching salary: regional gap?

Figure 6, p. 14
Individual total salaries: 2004-2005

Current dollar salaries

White: Non-Appalachian
Black: Appalachian

Salaries adjusted by CWI
District mean salaries: 2004-2005

Current dollar salaries
White: Non-Appalachian
Black: Appalachian

Salaries adjusted by CWI
Conclusions from work to date

- **Is there an Appalachian salary gap?**
  - Appalachian total and teaching salaries are significantly lower on average after controlling for …
    - teacher experience, rank and school level; ethnicity, gender, content area (Math/science) (regression with individual data)
    - teacher experience, school level, no. teachers, non-white student share, and metropolitan character (regression with district mean data)
  - Taking into account variation in cost-of-living as reflected in overall wage level may affect this perceived gap, however – closer look at wages follows
Median wage: elementary teachers – all occupations

2005-2006

Non-Appalachian

Bluegrass
Northern Kentucky
Lincoln Trail
Louisville
Barren River
Green River
Pennyville
Purchase

Appalachian

Buffalo Trace/Gateway
Fivco
Cumberland Valley
Kentucky River
Big Sandy
Lake Cumberland

Difference in median wage (elementary teachers - all occup.)

0 5,000 10,000 15,000 20,000
Median wage: math/science teachers – all occupations

2005-2006

Non-Appalachian

Northern Kentucky
Bluegrass
Lincoln Trail
Green River
Louisville
Pennyville
Barren River
Purchase
Kentucky River
Buffalo Trace/Gateway

Appalachian

Cumberland Valley
Fivco
Big Sandy
Lake Cumberland

Difference in median wage (math/science teachers - all occup.)
Median wage: elementary teachers – physical therapists

2005-2006

Non-Appalachian

- Pennyroyal
- Bluegrass
- Green River
- Barren River
- Purchase
- Northern Kentucky
- Louisville
- Lincoln Trail

Appalachian

- Buffalo Trace/Gateway
- Lake Cumberland
- Fivco
- Big Sandy
- Cumberland Valley
- Kentucky River

Difference in median wage (elementary teachers - physical therapists)
Median wage: elementary teachers – registered nurses

Difference in median wage (elementary teachers - registered nurses)
Median wage: elementary teachers – accountants

2005-2006

Non-Appalachian

Northern Kentucky
Lincoln Trail
Bluegrass
Louisville
Green River
Barren River
Pennyville
Purchase
Fivco
Buffalo Trace/Gateway
Lake Cumberland
Cumberland Valley
Kentucky River
Big Sandy

Difference in median wage (elementary teachers - accountants)
Median wage: elementary teachers – accountants

2005-2006

Non-Appalachian
- Northern Kentucky
- Lincoln Trail
- Bluegrass
- Louisville
- Green River
- Barren River
- Pennyroyal
- Purchase

Appalachian
- Fivco
- Buffalo Trace/Gateway
- Lake Cumberland
- Cumberland Valley
- Kentucky River
- Big Sandy

Difference in median wage (elementary teachers - accountants)
Conclusions from work to date

• **Within-Kentucky wage comparisons: where is teaching a more attractive occupational choice?**
  – Compared to general wage level, teaching appears more attractive in rural Eastern and far Western Kentucky than in the more urban area development districts (Bluegrass, N. Kentucky, Louisville).
  – Teaching’s draw relative to several occupations with similar educational/certification requirements does vary across the state.
  – This type of information could inform efforts to recruit young people from particular regions into teaching high demand subjects, given the importance of personal geography.
### 2005-2006: Math and science teachers vs. other middle and high school-level teachers

<table>
<thead>
<tr>
<th></th>
<th>KY, all middle and high-school teachers</th>
<th>KY, Not math or science</th>
<th>KY, Math or science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>41.6</td>
<td>41.8</td>
<td>41.3</td>
</tr>
<tr>
<td>% Male</td>
<td>36 %</td>
<td>37 %</td>
<td>33 %</td>
</tr>
<tr>
<td>% Non-white</td>
<td>4.3 %</td>
<td>4.8 %</td>
<td>3.3 %</td>
</tr>
<tr>
<td>Experience</td>
<td>11.7</td>
<td>11.7</td>
<td>11.6</td>
</tr>
<tr>
<td>Rank 1</td>
<td>25 %</td>
<td>24 %</td>
<td>26 %</td>
</tr>
<tr>
<td>Rank 2</td>
<td>51 %</td>
<td>51 %</td>
<td>51 %</td>
</tr>
<tr>
<td>Rank 3</td>
<td>23 %</td>
<td>24 %</td>
<td>22 %</td>
</tr>
<tr>
<td>Ranks 4, 5</td>
<td>1.0 %</td>
<td>0.9 %</td>
<td>1.1 %</td>
</tr>
<tr>
<td>Total salary</td>
<td>43,749</td>
<td>43,921</td>
<td>43,398</td>
</tr>
<tr>
<td>Teaching salary</td>
<td>42,685</td>
<td>42,727</td>
<td>42,599</td>
</tr>
<tr>
<td>N (non-missing)</td>
<td>14,993 – 15,235</td>
<td>10,059 – 10,236</td>
<td>4,934 – 4,999</td>
</tr>
</tbody>
</table>
Determinants of individual salaries: 2005-2006; N=29,742; OLS w/robust SE’s

<table>
<thead>
<tr>
<th>Variable</th>
<th>Y=ln(teaching salary)</th>
<th>Y= teaching salary ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience (years)</td>
<td>0.029</td>
<td>1,113</td>
</tr>
<tr>
<td>Experience^2</td>
<td>-0.0001</td>
<td>-17</td>
</tr>
<tr>
<td>Male teacher</td>
<td>0.009</td>
<td>377</td>
</tr>
<tr>
<td>Non-white teacher</td>
<td>0.047</td>
<td>2,102</td>
</tr>
<tr>
<td>Middle school (vs. Elem.)</td>
<td>0.004</td>
<td>176</td>
</tr>
<tr>
<td>High school (vs. Elem.)</td>
<td>0.010</td>
<td>500</td>
</tr>
<tr>
<td>Rank II (vs. Rank I)</td>
<td>-0.082</td>
<td>-3,900</td>
</tr>
<tr>
<td>Rank III (vs. Rank I)</td>
<td>-0.184</td>
<td>-7,341</td>
</tr>
<tr>
<td>Rank IV/V (vs. Rank I)</td>
<td>-0.235</td>
<td>-8,693</td>
</tr>
<tr>
<td>Math/Science</td>
<td>-0.007</td>
<td>-321</td>
</tr>
<tr>
<td>Appalachian district</td>
<td>-0.052</td>
<td>-2,455</td>
</tr>
<tr>
<td>Constant^a</td>
<td>10.5</td>
<td>37,449</td>
</tr>
</tbody>
</table>

* p < 0.10, **p < 0.05, *** p < 0.01