David S. Gibson

Improving Occupation Earnings Estimates Through Segregation of Education Levels
Agenda

- Purpose / approach
- Earnings results
- Prevalence results
Purpose

- Earnings by occupation broad usage
- Recognize diverse background within occupation
- Segregate by highest education
- Improve predictions
Approach

- **Workers**
  - Year-round, full-time
  - 25-64

- **Earnings**
  - Wages, tips, bonuses
  - Self-employed

- **Education levels**
  - Less than high school
  - HS diploma or equivalent
  - College less than bacc.
  - Baccalaureate
  - Masters
  - Ph.D. or professional
ACS Surveys

- PUMS
- 2010 – 2012
- Occupations merged
  - 2010-2011
  - 2012

American Community Survey

- Data Releases
- Data Product Descriptions
- Documentation
- Geography
- Downloadable data via FTP
- Summary File

Public Use Microdata Sample (PUMS)

- About PUMS
- PUMS Data
  - PUMS Documentation
  - PUMS on DataFerret
  - PUMS FAQs
- Custom Tabulations

Available through the American FactFinder website:
- 2008-2012 ACS 5-year PUMS
- 2010-2012 ACS 3-year PUMS
- 2012 ACS 1-year PUMS
- 2007-2011 ACS 5-year PUMS
- 2009-2011 ACS 3-year PUMS
- 2011 ACS 1-year PUMS
- 2006-2010 ACS 5-year PUMS
- 2008-2010 ACS 3-year PUMS
### Code Listing

**Handout A**

<table>
<thead>
<tr>
<th>Internal Code</th>
<th>PUMS Codes</th>
<th>ACS Description</th>
<th>SOC Code</th>
<th>SOC Title</th>
</tr>
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<tbody>
<tr>
<td>12200</td>
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<td>Architecture and Engineering Occupations:</td>
<td>17-0000</td>
<td>Architecture and Engineering Occupations</td>
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<tr>
<td>12201 1300</td>
<td></td>
<td>Architects, except naval</td>
<td>17-1010</td>
<td>Architects, Except Naval</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17-1011</td>
<td>Architects, Except Landscape and Naval</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17-1012</td>
<td>Landscape Architects</td>
</tr>
<tr>
<td>12202 1310</td>
<td></td>
<td>Surveyors, cartographers, and photogrammetrists</td>
<td>17-1021</td>
<td>Cartographers and Photogrammetrists</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>17-1022</td>
<td>Surveyors</td>
</tr>
<tr>
<td>12203 1320</td>
<td></td>
<td>Aerospace engineers</td>
<td>17-2011</td>
<td>Aerospace Engineers</td>
</tr>
<tr>
<td>12204 1330, 1340</td>
<td></td>
<td>Biomedical and agricultural engineers</td>
<td>17-2021</td>
<td>Agricultural Engineers</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>17-2031</td>
<td>Biomedical Engineers</td>
</tr>
</tbody>
</table>
Spreading by Education

Median Annual Earnings

- PhD/Prof
- < HS
- Overall

Computer, Eng, Scientific
Mgt, Bus, Financial
Health Pro, Tech Occup
Protective Svcs, Educ, Legal, Comm Svcs, Arts
Install/Maint, Repair
Sales & Related
Construction/Extraction
Offc/Admin Supp
Production
Transport/Mt Moving
Health Support
Bldg/Grounds Maint
Pers Care/Services
Farm, Fish, Forest
Food Prep, Serving
Accountants & auditors
- Males
- Wide range of skills

Median $79,000
Mean $104,314

<table>
<thead>
<tr>
<th>Education</th>
<th>Median</th>
<th>Mean</th>
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<tbody>
<tr>
<td>GED / HS</td>
<td>$49,000</td>
<td>$59,208</td>
</tr>
<tr>
<td>Coll. &lt; Bacc.</td>
<td>$52,000</td>
<td>$57,012</td>
</tr>
<tr>
<td>Bacc. Only</td>
<td>$78,000</td>
<td>$77,491</td>
</tr>
<tr>
<td>Masters</td>
<td>$92,000</td>
<td>$119,373</td>
</tr>
<tr>
<td>PhD/Prof.</td>
<td>$107,000</td>
<td>$145,961</td>
</tr>
<tr>
<td>All</td>
<td>$79,000</td>
<td>$104,314</td>
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</table>
Male Accountants again

Determine prevalence by education

Compare to all FTYR males

Ratio identifies “Tendency Ratio”
  • < 34% Avoided
  • 34-67% Unlikely
  • 68%-149% Normal
  • 150%-199% Likely
  • 200%+ Highly Likely

<table>
<thead>
<tr>
<th>Educat.</th>
<th>Account %</th>
<th>Males %</th>
<th>Tendency Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED / HS</td>
<td>1.6%</td>
<td>26.8%</td>
<td>0.1</td>
</tr>
<tr>
<td>&lt; Bacc.</td>
<td>7.5%</td>
<td>29.5%</td>
<td>0.3</td>
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<tr>
<td>Bacc.</td>
<td>62.1%</td>
<td>21.6%</td>
<td>2.9</td>
</tr>
<tr>
<td>Masters</td>
<td>24.9%</td>
<td>12.5%</td>
<td>3.2</td>
</tr>
<tr>
<td>PhD</td>
<td>3.7%</td>
<td>4.6%</td>
<td>0.8</td>
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<td>Code</td>
<td>Management, Business, Science, and Arts Occupations:</td>
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<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>Code Description</td>
<td>Mn</td>
<td>Med</td>
</tr>
<tr>
<td>2,155,066</td>
<td>Management, Business, Science, and Arts</td>
<td>83,294</td>
<td>64,000</td>
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<td></td>
<td>Occupations:</td>
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<td></td>
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<tr>
<td>344,400</td>
<td>Computer, Engineering, and Science Occupations:</td>
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<td>123,882</td>
<td>Architecture and Engineering Occupations:</td>
<td>87,860</td>
<td>79,000</td>
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<tr>
<td>12201</td>
<td>Architects, except naval</td>
<td>90,067</td>
<td>75,000</td>
</tr>
<tr>
<td>12202</td>
<td>Surveyors, cartographers, and 12202</td>
<td>64,939</td>
<td>60,000</td>
</tr>
</tbody>
</table>
Observations / Anomalies

- Low education in unexpected places
  - Example: Aerospace engineers, page 1
  - Earnings still spread logically
  - Physicians / surgeons with low education
    - Page 9
    - 132 in 2012 below doctorate
    - Baccalaureate earnings highest
    - Mostly US born

- High education in unexpected places
  - Example: Construction laborers, page 17
  - Earnings still increase with education
  - Signal of human capital
Low Education Jobs

Full-time, Year-round, Both Genders

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Salary Range</th>
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<tbody>
<tr>
<td>&lt; HS</td>
<td>$0 - $30,000</td>
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<tr>
<td>HS / GED</td>
<td>$30,000 - $40,000</td>
</tr>
<tr>
<td>Coll &lt;Bacc</td>
<td>$40,000 - $50,000</td>
</tr>
<tr>
<td>Bacc.</td>
<td>$50,000 - $60,000</td>
</tr>
<tr>
<td>Masters</td>
<td>$60,000 - $70,000</td>
</tr>
<tr>
<td>Phd/Prof</td>
<td>$70,000 - $80,000</td>
</tr>
</tbody>
</table>

Legend:
- Mean
- % These Jobs
- % Education Average
High Education Jobs

Full-time, Year-round, Both Genders

- < HS
- HS / GED
- Coll < Bacc
- Bacc.
- Masters
- Phd/Prof

Mean
% These Jobs
% Education Average
Top Paying < High School

- Farmers, ranchers
- Driver/sales workers/drivers
- Food service managers
- Carpenters
- Gaming services workers
- Farmers, ranchers
- 1st line supervisors - construction
- Mining machine operators
- Derrick, rotary drill, roustabouts, etc
- Ship, boat captains/operators

Mean Annual Earnings

$0 $10,000 $20,000 $30,000 $40,000 $50,000 $60,000 $70,000 $80,000
Top Paying - High School

- Telecom line installers
- 1st line supervisors - construction
- Radio, tel. equip installers
- Postal service carriers
- Postal service clerks
- Ship, boat captains
- Locomotive engineers/operators
- Electrical repairers
- Elevator installers, repairers
- Power plant operators

Mean Annual Earnings

$0  $10,000  $20,000  $30,000  $40,000  $50,000  $60,000  $70,000  $80,000  $90,000
Top Paying - College < Bacc.

1st line supervisors - police
Info. Security analysts
Geological/petrol technicians
Air traffic control/airfield ops
Radiation therapists
Info. Security analysts
Power plant operators
Computer network architects
1st line supervisors - fire fighting
Air traffic control/airfield ops

Mean Annual Earnings

$0  $20,000  $40,000  $60,000  $80,000  $100,000  $120,000
Top Paying - Baccalaureate

- Securities/fin sales agent
- Pharmacists
- Actuaries
- Architec. / engineer managers
- Chief executives / legislators
- Petrol, mining, geo engineers
- Financial analysts
- Actuaries
- Securities/fin sales agent
- Chief executives / legislators

Mean Annual Earnings

- $0
- $25,000
- $50,000
- $75,000
- $100,000
- $125,000
- $150,000
- $175,000
- $200,000
Top Paying - Masters

Mean Annual Earnings

- Personal financial advisors
- Financial analysts
- Architec. / engineer managers
- Chief executives / legislators
- Nurse Anesthetists
- Financial analysts
- Financial specialists
- Securities/commod sales agents
- Chief executives / legislators
- Nurse Anesthetists

Mean Annual Earnings:

- $0
- $50,000
- $100,000
- $150,000
- $200,000
- $250,000
Top Paying - PhD/Prof.

- Dentists
- Chief executives / legislators
- Economists
- Physicians, surgeons
- Nurse anesthetists
- Dentists
- Chief executives / legislators
- Financial Analysts
- Actuaries
- Physicians, surgeons
# Detail Occupation Data

Here is a table summarizing data for occupations in the Management, Business, Science, and Arts fields. The data is broken down by gender and highest education level. Each row represents a different level of education, from less than 9th grade to doctorate degree. The columns show the number of people (N), weighted number (Wtd N), average earnings (AvgEarn), and income percentiles (Bot 10%, Bot 25%, Median, Top 25%, Top 10%).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Highest Education</th>
<th>N</th>
<th>Wtd N</th>
<th>AvgEarn</th>
<th>Bot 10%</th>
<th>Bot 25%</th>
<th>Median</th>
<th>Top 25%</th>
<th>Top 10%</th>
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</thead>
<tbody>
<tr>
<td>Both Genders</td>
<td>Master Level 10000 Management, Business, Science, and Arts Occupations:</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less Than 9th grade</td>
<td>3,826</td>
<td>133,958</td>
<td>51,677</td>
<td>15,000</td>
<td>23,000</td>
<td>38,000</td>
<td>61,000</td>
<td>96,000</td>
</tr>
<tr>
<td></td>
<td>Some High School</td>
<td>8,907</td>
<td>320,513</td>
<td>52,002</td>
<td>16,000</td>
<td>26,000</td>
<td>40,000</td>
<td>61,000</td>
<td>94,000</td>
</tr>
<tr>
<td></td>
<td>GED or Alt. Credential</td>
<td>10,311</td>
<td>336,893</td>
<td>53,225</td>
<td>20,000</td>
<td>29,000</td>
<td>43,000</td>
<td>64,000</td>
<td>94,000</td>
</tr>
<tr>
<td></td>
<td>High School Graduate</td>
<td>83,620</td>
<td>2,839,214</td>
<td>56,100</td>
<td>21,000</td>
<td>31,000</td>
<td>45,000</td>
<td>67,000</td>
<td>96,000</td>
</tr>
<tr>
<td></td>
<td>Some College, No Degree</td>
<td>155,732</td>
<td>5,377,121</td>
<td>62,037</td>
<td>24,000</td>
<td>35,000</td>
<td>52,000</td>
<td>75,000</td>
<td>105,000</td>
</tr>
<tr>
<td></td>
<td>Associate Degree</td>
<td>106,930</td>
<td>3,537,151</td>
<td>61,356</td>
<td>27,000</td>
<td>39,000</td>
<td>54,000</td>
<td>75,000</td>
<td>98,000</td>
</tr>
<tr>
<td></td>
<td>Baccalaureate Degree</td>
<td>384,759</td>
<td>13,201,450</td>
<td>83,701</td>
<td>33,000</td>
<td>46,000</td>
<td>66,000</td>
<td>98,000</td>
<td>139,000</td>
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<td>Master's Degree</td>
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<td>7,083,005</td>
<td>94,074</td>
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<td>75,000</td>
<td>108,000</td>
<td>157,000</td>
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<td>Professional Degree</td>
<td>66,039</td>
<td>2,087,517</td>
<td>161,562</td>
<td>48,000</td>
<td>68,000</td>
<td>113,000</td>
<td>210,000</td>
<td>361,000</td>
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<tr>
<td></td>
<td>Doctorate Degree</td>
<td>41,011</td>
<td>1,332,372</td>
<td>119,606</td>
<td>45,000</td>
<td>64,000</td>
<td>96,000</td>
<td>136,000</td>
<td>214,000</td>
</tr>
</tbody>
</table>
Future Potential

- Local-based
  - 5-years
  - Some limitations
- Age-earnings?
- Others?
Contact Information

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