New Education Classification Better Reflects Income and Spending Patterns in the Consumer Expenditure Survey

Ann C. Foster
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New Education Classification Better Reflects Income and Spending Patterns in the Consumer Expenditure Survey

Abstract
An individual's level of education and associated earnings profoundly influence spending patterns. Published Consumer Expenditure Survey (CE) data shown average expenditures, income, and other consumer unit (CU) characteristics classified by education of the reference person. With the release of calendar year 2012 CE data on September 10, 2013, the education of reference person classification was replaced by the highest education level of any member in the consumer unit.

The major reason for this change is that the highest level of education attained by any household member more accurately reflects income and spending patterns than does the education level of the reference person only. For example, data from the Census Bureau show that the proportion of married couples where the wife is the more educated spouse increased during the 1996–2010 period. This means that the education level in families where the husband is designated as the reference person could be understated.

Table 1 shows selected characteristics, mean annual expenditures, and expenditure shares for consumer units classified by the highest level of education of any CU member, which is the new breakdown. Table 2 presents the same data classified by education of the reference person, which is the old breakdown. (Both tables show data for 2012.)

Keywords

Comments
Suggested Citation

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New education classification better reflects income and spending patterns in the Consumer Expenditure Survey

Author: Ann C. Foster

An individual’s level of education and associated earnings profoundly influence spending patterns.\(^1\) Published Consumer Expenditure Survey (CE) data tables have shown average expenditures, income, and other consumer unit (CU) characteristics classified by education of the reference person. With the release of calendar year 2012 CE data on September 10, 2013, the education of reference person classification was replaced by the highest education level of any member in the consumer unit.\(^2\)

The major reason for this change is that the highest level of education attained by any household member more accurately reflects income and spending patterns than does the education

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level of the reference person only.\textsuperscript{3} For example, data from the Census Bureau show that the proportion of married couples where the wife is the more educated spouse increased during the 1996–2010 period.\textsuperscript{4} This means that the education level in families where the husband is designated as the reference person could be understated.

Table 1 shows selected characteristics, mean annual expenditures, and expenditure shares for consumer units classified by the highest level of education of any CU member, which is the new breakdown. Table 2 presents the same data classified by education of the reference person, which is the old breakdown. (Both tables show data for 2012.)

**Category and pretax income differences**

Classification by highest level of education shifted almost 7 percent of the CUs in the sample from the less-than-college-graduate section to the college-graduate section, resulting in 61.7 percent of CUs categorized as less than college graduate and 38.3 percent categorized as college graduate. The greatest drop was in the less than high school graduate from 13.1 percent to 8.5 percent, a reduction of 5.7 million households, and the high school graduate categories from 24.9 percent to 21.4 percent, a reduction of 4.4 million households. The proportion of CUs falling into the “high school graduate with some college” and the “associate’s degree” categories was similar in both tables. Using the new breakdown increased the proportion of CUs falling into the bachelor’s degree category (22.6 percent, compared with 19.9 percent in the old breakdown) and master’s, professional, doctoral degree category (15.7 percent, compared with 11.6 percent in the old breakdown).

Tables 1 and 2 show that average pretax income increased with the level of education. With one exception, the average dollar amount of pretax income was higher when using the old breakdown. In the new breakdown, pretax income for the master’s, professional, doctoral degree group was $119,023—compared with $117,233 for the same group classified by the reference person’s education.

**Annual expenditures**

In tables 1 and 2, total annual expenditures also increased with the level of education and associated income. Except for the master’s, professional, doctoral degree level, mean annual expenditures at every level of education were less when classified by highest level of education of any member (the new breakdown), compared with those classified by the reference person’s education (the old breakdown).

**Food, housing, and transportation**

The dollar amount spent on each of the three categories increased with level of education and associated level of income. The relative share of these amounts differed by level of education. For example, food spending accounted for a greater share of the household budget at lower education levels. One exception is found in the old breakdown where households at the high-school-graduate-with-some-college level spent 13.1 percent of the budget on food, compared with 13.3 percent of the budget for households at the associate’s degree level. The reason is that food at home—a component of food spending—accounted for a greater share of the budget of households at the associate’s level 7.9 percent, compared with 7.7 percent for the high-school-graduate-with-some-college category).

Housing expense patterns varied somewhat between the new and the old breakdowns, most likely because of the differences in housing tenure. When classified by highest education level, the homeownership rate ranged from 47 percent for the less-than-high-school-graduate category to 79 percent for the master’s, professional, doctoral degree category. When classified by reference person’s education, these proportions were 51 and 78 percent, respectively. These differences may account for the greater differential in dollar outlays between the less-than-high-school-graduate category and the master’s, professional, doctoral degree category in the new breakdown ($9,388 compared with $26,512). In the old breakdown this differential was $11,197 compared with $26,322). The budget shares accounted for by housing narrowly declined as education and associated income increased in both breakdowns.
## Table 1

**Highest education level of any member: Annual expenditure means and shares, 2012**

<table>
<thead>
<tr>
<th>Item</th>
<th>All consumer units</th>
<th>Less than college graduate</th>
<th>College graduate</th>
<th>Master’s, professional, doctoral degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Less than high school graduate</td>
<td>High school graduate</td>
<td>High school with some college</td>
</tr>
<tr>
<td>Number of consumer units (in thousands)</td>
<td>124,416</td>
<td>76,789</td>
<td>10,571</td>
<td>26,601</td>
</tr>
<tr>
<td>Percentage of consumer units</td>
<td>100.0</td>
<td>61.7</td>
<td>8.5</td>
<td>21.4</td>
</tr>
<tr>
<td>Consumer unit characteristic:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pretax income</td>
<td>$65,596</td>
<td>$44,603</td>
<td>$25,159</td>
<td>$39,357</td>
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<tr>
<td>Age (reference person)</td>
<td>50.0</td>
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<tr>
<td>Average number in consumer unit:</td>
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<td></td>
</tr>
<tr>
<td>Persons</td>
<td>2.5</td>
<td>2.4</td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Children under 18</td>
<td>.6</td>
<td>.6</td>
<td>.7</td>
<td>.6</td>
</tr>
<tr>
<td>Persons 65 and older</td>
<td>.3</td>
<td>.4</td>
<td>.5</td>
<td>.4</td>
</tr>
<tr>
<td>Earners</td>
<td>1.3</td>
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<td>.7</td>
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</tr>
<tr>
<td>Vehicles</td>
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<td>1.7</td>
<td>1.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Percent distribution:</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Sex (reference person):</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>47</td>
<td>44</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>56</td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Race (reference person):</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black or African-American</td>
<td>13</td>
<td>15</td>
<td>16</td>
<td>15</td>
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<tr>
<td>White, Asian, and all other races</td>
<td>87</td>
<td>85</td>
<td>84</td>
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<tr>
<td>Hispanic or Latino origin (reference person):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>87</td>
<td>84</td>
<td>85</td>
<td>86</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>16</td>
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<td>14</td>
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<tr>
<td>Housing tenure:</td>
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<td></td>
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<tr>
<td>Homeowner</td>
<td>64</td>
<td>58</td>
<td>47</td>
<td>59</td>
</tr>
<tr>
<td>With mortgage</td>
<td>39</td>
<td>31</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>Without mortgage</td>
<td>26</td>
<td>27</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Renter</td>
<td>36</td>
<td>42</td>
<td>53</td>
<td>41</td>
</tr>
<tr>
<td>At least one vehicle owned or leased</td>
<td>88</td>
<td>84</td>
<td>70</td>
<td>84</td>
</tr>
<tr>
<td>Total annual expenditures:</td>
<td>$51,142</td>
<td>$39,707</td>
<td>$24,582</td>
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### Food

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<td>5,409</td>
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<tr>
<td>3,913</td>
<td>15.9</td>
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<td>4,944</td>
<td>14.2</td>
</tr>
<tr>
<td>5,749</td>
<td>13.4</td>
</tr>
<tr>
<td>6,658</td>
<td>13.1</td>
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<tr>
<td>8,435</td>
<td>11.9</td>
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<td>7,928</td>
<td>12.6</td>
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<tr>
<td>9,143</td>
<td>11.1</td>
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### Food at home

<table>
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<td>3,921</td>
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<tr>
<td>3,442</td>
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<tr>
<td>2,862</td>
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<tr>
<td>2,363</td>
<td>9.4</td>
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<tr>
<td>3,542</td>
<td>8.2</td>
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<tr>
<td>3,164</td>
<td>7.8</td>
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<tr>
<td>4,654</td>
<td>6.5</td>
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<tr>
<td>4,380</td>
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<tr>
<td>5,032</td>
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### Housing

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<td>16,887</td>
<td>32.8</td>
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<td>9,388</td>
<td>38.2</td>
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<tr>
<td>12,143</td>
<td>34.9</td>
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<tr>
<td>14,241</td>
<td>33.1</td>
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<tr>
<td>16,146</td>
<td>31.8</td>
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<tr>
<td>22,815</td>
<td>32.1</td>
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<tr>
<td>20,230</td>
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<tr>
<td>26,512</td>
<td>32.1</td>
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### Apparel and services

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<td>1,736</td>
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<td>1,329</td>
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<td>1,042</td>
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<tr>
<td>1,083</td>
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<tr>
<td>1,540</td>
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<tr>
<td>1,588</td>
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</tr>
<tr>
<td>2,366</td>
<td>3.3</td>
</tr>
<tr>
<td>2,226</td>
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<tr>
<td>2,565</td>
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### Transportation

<table>
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<td>8,998</td>
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<td>7,381</td>
<td>18.9</td>
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<td>3,835</td>
<td>15.6</td>
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<tr>
<td>6,225</td>
<td>17.9</td>
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<tr>
<td>8,422</td>
<td>19.6</td>
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<tr>
<td>10,342</td>
<td>20.3</td>
</tr>
<tr>
<td>11,594</td>
<td>16.3</td>
</tr>
<tr>
<td>10,817</td>
<td>17.1</td>
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<tr>
<td>12,710</td>
<td>15.4</td>
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</table>

### Healthcare

<table>
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<td>3,556</td>
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<tr>
<td>2,885</td>
<td>7.4</td>
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<tr>
<td>2,004</td>
<td>8.2</td>
</tr>
<tr>
<td>2,823</td>
<td>8.1</td>
</tr>
<tr>
<td>2,949</td>
<td>6.9</td>
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<tr>
<td>3,560</td>
<td>7.0</td>
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<tr>
<td>4,635</td>
<td>6.5</td>
</tr>
<tr>
<td>4,196</td>
<td>6.6</td>
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<tr>
<td>5,263</td>
<td>6.4</td>
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</table>

### Entertainment

<table>
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<th>Mean</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,605</td>
<td>5.1</td>
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<tr>
<td>1,901</td>
<td>4.9</td>
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<tr>
<td>1,134</td>
<td>4.6</td>
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<tr>
<td>1,630</td>
<td>4.7</td>
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<td>2,118</td>
<td>4.9</td>
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<tr>
<td>2,571</td>
<td>5.1</td>
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<tr>
<td>3,725</td>
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<tr>
<td>3,320</td>
<td>5.1</td>
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<tr>
<td>4,443</td>
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### Pensions and Social Security

<table>
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<tr>
<th>Mean</th>
<th>Share</th>
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<td>5,238</td>
<td>10.2</td>
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<tr>
<td>3,220</td>
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<tr>
<td>1,374</td>
<td>5.6</td>
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<tr>
<td>2,645</td>
<td>7.6</td>
</tr>
<tr>
<td>3,598</td>
<td>8.4</td>
</tr>
<tr>
<td>5,032</td>
<td>9.9</td>
</tr>
<tr>
<td>8,493</td>
<td>11.9</td>
</tr>
<tr>
<td>7,139</td>
<td>11.3</td>
</tr>
<tr>
<td>10,436</td>
<td>12.6</td>
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</table>

### Other

<table>
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<th>Mean</th>
<th>Share</th>
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<td>5822</td>
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</tr>
<tr>
<td>3784</td>
<td>9.7</td>
</tr>
<tr>
<td>1894</td>
<td>7.7</td>
</tr>
<tr>
<td>3293</td>
<td>9.5</td>
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<td>4424</td>
<td>10.3</td>
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<td>7379</td>
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</tr>
<tr>
<td>11533</td>
<td>14.0</td>
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</tbody>
</table>

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## Table 2

### Education of reference person: Annual expenditure means and shares, 2012

<table>
<thead>
<tr>
<th>Item</th>
<th>All consumer units</th>
<th>Less than college graduate</th>
<th>College graduate</th>
<th>Total</th>
<th>Bachelor’s degree</th>
<th>Master’s, professional, doctoral degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of consumer units (in thousands)</td>
<td>124,416</td>
<td>85,178</td>
<td>16,246</td>
<td>31,022</td>
<td>25,623</td>
<td>12,287</td>
</tr>
<tr>
<td>Percentage of consumer units</td>
<td>100.0</td>
<td>68.5</td>
<td>13.1</td>
<td>24.9</td>
<td>20.6</td>
<td>9.9</td>
</tr>
<tr>
<td>Consumer unit characteristic:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pretax income</td>
<td>$65,596</td>
<td>$49,901</td>
<td>$33,154</td>
<td>$47,221</td>
<td>$55,987</td>
<td>$66,122</td>
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<tr>
<td>Age (reference person)</td>
<td>50.0</td>
<td>50.7</td>
<td>54.6</td>
<td>52.4</td>
<td>47.5</td>
<td>47.9</td>
</tr>
<tr>
<td>Average number in consumer unit:</td>
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<td></td>
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</tr>
<tr>
<td>Persons</td>
<td>2.5</td>
<td>2.5</td>
<td>2.7</td>
<td>2.5</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Children under 18</td>
<td>1.3</td>
<td>1.2</td>
<td>1.0</td>
<td>1.2</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td>Persons 65 and older</td>
<td>1.9</td>
<td>1.8</td>
<td>1.4</td>
<td>1.9</td>
<td>2.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Earners</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles</td>
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<td></td>
</tr>
<tr>
<td>Percent distribution</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex of Reference Person:</td>
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<td></td>
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</tr>
<tr>
<td>Male</td>
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<td>44</td>
<td>44</td>
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<td>45</td>
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<td>Female</td>
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<td>54</td>
<td>55</td>
<td>60</td>
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<td>Race (reference person):</td>
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</tr>
<tr>
<td>Black or African-American</td>
<td>13</td>
<td>15</td>
<td>15</td>
<td>14</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>White, Asian, and all other races</td>
<td>87</td>
<td>85</td>
<td>85</td>
<td>86</td>
<td>86</td>
<td>85</td>
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<tr>
<td>Hispanic or Latino origin (reference person):</td>
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<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>13</td>
<td>16</td>
<td>35</td>
<td>12</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Not Hispanic or Latino</td>
<td>87</td>
<td>84</td>
<td>65</td>
<td>88</td>
<td>90</td>
<td>90</td>
</tr>
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<td>Housing tenure:</td>
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<tr>
<td>Homeowner</td>
<td>64</td>
<td>60</td>
<td>51</td>
<td>63</td>
<td>59</td>
<td>68</td>
</tr>
<tr>
<td>With mortgage</td>
<td>39</td>
<td>33</td>
<td>21</td>
<td>33</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>Without mortgage</td>
<td>26</td>
<td>27</td>
<td>30</td>
<td>31</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Renter</td>
<td>36</td>
<td>40</td>
<td>49</td>
<td>37</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>At least one vehicle owned or leased</td>
<td>88</td>
<td>85</td>
<td>75</td>
<td>86</td>
<td>87</td>
<td>93</td>
</tr>
<tr>
<td>Total annual expenditures:</td>
<td>$51,442</td>
<td>$41,983</td>
<td>$31,194</td>
<td>$39,889</td>
<td>$46,118</td>
<td>$71,926</td>
</tr>
</tbody>
</table>

### Price and Spending

#### Total annual expenditures:

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>6,599</td>
<td>12.8</td>
</tr>
<tr>
<td>Food at home</td>
<td>3,921</td>
<td>7.6</td>
</tr>
<tr>
<td>Food away from home</td>
<td>2,678</td>
<td>5.2</td>
</tr>
<tr>
<td>Housing</td>
<td>16,887</td>
<td>32.8</td>
</tr>
<tr>
<td>Apparel and services</td>
<td>1,736</td>
<td>3.4</td>
</tr>
<tr>
<td>Transportation</td>
<td>8,998</td>
<td>17.5</td>
</tr>
<tr>
<td>Healthcare</td>
<td>3,556</td>
<td>6.9</td>
</tr>
<tr>
<td>Entertainment</td>
<td>2,605</td>
<td>5.1</td>
</tr>
<tr>
<td>Pensions and Social Security</td>
<td>5,238</td>
<td>10.2</td>
</tr>
<tr>
<td>Other1</td>
<td>5,822</td>
<td>11.3</td>
</tr>
</tbody>
</table>

1. Includes cash contributions, alcohol, tobacco, personal care products and services, reading, education, life and personal insurance, and miscellaneous expenses.

One factor could be the higher outlays for mortgage interest, property taxes, and repair and maintenance by homeowners.

Transportation expense patterns also varied between the old and the new breakdowns. In both breakdowns, the dollar amount accounted for by transportation expenses increased with level of education and associated level of income. The share of the household budget accounted for by transportation varied by breakdown. In the new breakdown, transportation's share of the household budget increased from 15.6 percent for those with less than a high school education to 20.3 percent for those with an associate's degree and then declined from 17.1 percent for those with a bachelor's degree to 15.4 percent for those at the master's, professional, doctoral degree level. In the old breakdown, transportation expenses claimed 17.7 percent of the budget of households in the less-than-high-school-graduate category, increasing to 19 percent for each of the other three categories in the less-than-college-graduate section before declining to 16.6 percent for those in the bachelor's degree category and 14.7 percent for those in the master's, professional, and doctoral degree category. In both breakdowns, households in the less-than-high-school-graduate category were less apt to own a vehicle than households in the remaining categories; 70 percent in the new breakdown and 75 percent in the old breakdown did not own a car. As a comparison, almost all (94 percent in the new breakdown and 93 percent in the old breakdown) households in the master's, professional, and doctoral degree categories owned at least one vehicle. In both breakdowns, lower vehicle ownership among households with less than a high school education would reduce the amount spent on vehicle purchases, insurance, and repairs, lowering transportation costs relative to households in the remaining categories.

**Other spending**

In both breakdowns, the dollar amount spent on healthcare increased with level of education and associated income. Households at higher levels of education and associated income spent a lower share of the budget on healthcare than those at lower levels, regardless of breakdown.

Entertainment spending followed similar patterns in both the old and the new breakdowns, increasing in dollar amount with level of education and associated income. In both breakdowns, entertainment spending narrowly ranged from about 4.5 percent of the household budget for the less-than-high-school-graduate category to 5.4 percent of spending for households in the master's, professional, doctoral degree category.

Outlays on pensions and Social Security differed in the old and new breakdowns. In both breakdowns, the average annual outlay and share of the household budget increased with level of education and associated level of income. In the new breakdown, however, the average annual outlay and share of the household budget were below comparable categories in the old breakdown, particularly at the lowest levels of education and associated levels of income. For example, households classified as less than high school graduate averaged $1,374 (5.6 percent of total spending) for pensions and Social Security in the new breakdown, compared with $2,085 (6.7 percent) in the old breakdown. Households in the high school graduate category averaged $2,645 (7.6 percent of total spending) in the new breakdown, compared with $3,401 (8.5 percent of total spending) in the old breakdown. One reason could be that there were fewer earners in the new breakdown compared with the old. For example, households classified as less than high school averaged 0.7 earners in the new breakdown compared with 1.0 earner in the old breakdown; for households classified as high school graduate these averages were 1.0 and 1.2 earners, respectively. Another reason could be the lower pretax income, earlier mentioned, among household groups in the new breakdown in relation to comparable households in the old breakdown. Because saving usually increases with income, households in the new breakdown might have reduced voluntary pension contributions to 401(k) plans or IRAs, to free up additional funds for consumption.

**Income sources**

For households at the lowest levels of education, sources of pretax income differed somewhat between the old and the new breakdowns. These differences might explain some of
the variations in spending patterns mentioned earlier. One difference is that in the new breakdown (table 3), wages and salaries accounted for a lower proportion of pretax income for those households with less than a college degree than in the old breakdown. (See table 4.) For example, in the new breakdown, wages and salaries averaged 56.8 percent of pretax income for households classified as less than a high school graduate and 68.7 percent of pretax income for households classified as high school graduate, compared with 67.4 percent and 72.8 percent, respectively, in the old breakdown. Another reason is that in the new breakdown, Social Security, private, and government retirement benefits accounted for a higher proportion of pretax income for households with less than a college education than in the old breakdown. For example, in the new breakdown, Social Security, private, and government retirement benefits

<table>
<thead>
<tr>
<th>Item</th>
<th>All consumer units</th>
<th>Less than college graduate</th>
<th>College graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Less than high school graduate</td>
<td>High school graduate</td>
</tr>
<tr>
<td>Number of consumer units (in thousands)</td>
<td>124,416</td>
<td>10,571</td>
<td>26,601</td>
</tr>
<tr>
<td>Percentage of consumer units</td>
<td>100.0</td>
<td>8.5</td>
<td>21.4</td>
</tr>
<tr>
<td>Pretax income:</td>
<td>$65,596</td>
<td>$25,159</td>
<td>$39,357</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>51,730</td>
<td>27,021</td>
<td>51,460</td>
</tr>
<tr>
<td>Share</td>
<td>78.9</td>
<td>68.7</td>
<td>81.9</td>
</tr>
<tr>
<td>Self-employment income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2,917</td>
<td>1,950</td>
<td>2,329</td>
</tr>
<tr>
<td>Share</td>
<td>4.4</td>
<td>4.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Social Security, private and government retirement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>8,021</td>
<td>6,888</td>
<td>6,692</td>
</tr>
<tr>
<td>Share</td>
<td>12.2</td>
<td>14.3</td>
<td>10.7</td>
</tr>
<tr>
<td>Interest, dividends, rental income, other property income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1,358</td>
<td>930</td>
<td>705</td>
</tr>
<tr>
<td>Share</td>
<td>2.1</td>
<td>1.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Unemployment and workers' compensation, veterans' benefits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>428</td>
<td>353</td>
<td>353</td>
</tr>
<tr>
<td>Share</td>
<td>0.7</td>
<td>0.9</td>
<td>1.1</td>
</tr>
<tr>
<td>Public assistance, supplemental security income, food stamps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>534</td>
<td>571</td>
<td>552</td>
</tr>
<tr>
<td>Share</td>
<td>0.8</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Regular contributions for support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>380</td>
<td>529</td>
<td>356</td>
</tr>
<tr>
<td>Share</td>
<td>0.6</td>
<td>1.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Other income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>229</td>
<td>334</td>
<td>104</td>
</tr>
<tr>
<td>Share</td>
<td>0.3</td>
<td>0.7</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 4

| Education of reference person: Annual pretax income means and shares, 2012 |
|-------------------------------------------------|-----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Item                                                 | All consumer units | Less than college graduate | College graduate | All consumer units | Less than college graduate | College graduate | All consumer units | Less than college graduate | College graduate | All consumer units | Less than college graduate | College graduate | All consumer units | Less than college graduate | College graduate |
|------------------------------------------------------|-----------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Number of consumer units (in thousands)              | 124,416         | 85,178            | 16,246          | 31,022          | 25,623          | 12,287          | 39,238          | 24,798          | 14,440          |
| Percentage of consumer units                         | 100.0           | 68.5              | 13.1            | 24.9            | 20.6            | 9.9             | 31.5            | 19.9            | 11.6            |
| Wages and salaries                                   |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 51,730          | 37,707            | 22,359          | 34,368          | 43,408          | 54,543          | 82,171          | 74,554          | 95,254          |
| Share                                                | 78.9            | 75.6              | 67.4            | 72.8            | 77.5            | 82.5            | 82.4            | 83.4            | 81.3            |
| Self-employment income                               |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 2,917           | 2,060             | 1,512           | 2,028           | 2,198           | 2,574           | 4,778           | 4,736           | 4,850           |
| Share                                                | 4.4             | 4.1               | 4.6             | 4.3             | 3.9             | 3.9             | 4.8             | 5.3             | 4.1             |
| Social Security, private and government retirement   |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 8,021           | 7,592             | 7,054           | 8,570           | 7,182           | 6,691           | 8,953           | 7,053           | 12,215          |
| Share                                                | 12.2            | 15.2              | 21.3            | 18.1            | 12.8            | 10.1            | 9.0             | 7.9             | 10.4            |
| Interest, dividends, rental income, other property income |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 1,358           | 829               | 289             | 720             | 1,361           | 710             | 2,506           | 1,843           | 3,643           |
| Share                                                | 2.1             | 1.7               | 0.9             | 1.5             | 2.4             | 1.1             | 2.5             | 2.1             | 3.1             |
| Unemployment and workers’ compensation, veterans’ benefits |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 428             | 462               | 376             | 406             | 506             | 626             | 355             | 356             | 354             |
| Share                                                | 0.7             | 0.9               | 1.1             | 0.9             | 0.9             | 0.9             | 0.4             | 0.4             | 0.3             |
| Public assistance, supplemental security income, food stamps |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 534             | 688               | 1,165           | 678             | 498             | 478             | 198             | 207             | 184             |
| Share                                                | 0.8             | 1.4               | 3.5             | 1.4             | 0.9             | 0.7             | 0.2             | 0.2             | 0.2             |
| Regular contributions for support                    |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 380             | 348               | 189             | 276             | 316             | 392             | 447             | 496             | 362             |
| Share                                                | 0.6             | 0.7               | 0.6             | 0.6             | 0.6             | 0.6             | 0.6             | 0.6             | 0.3             |
| Other income                                         |                 |                   |                 |                 |                 |                 |                 |                 |                 |
| Mean                                                 | 229             | 215               | 211             | 174             | 318             | 108             | 259             | 193             | 371             |
| Share                                                | 0.3             | 0.4               | 0.6             | 0.4             | 0.6             | 0.2             | 0.3             | 0.2             | 0.3             |


accounted for 28.8 percent of pretax income for households classified as less than a high school graduate and 21.3 percent of pretax income for households classified as high school graduate, compared with 21.3 percent and 18.1 percent, respectively, in the old breakdown. It was mentioned earlier that in the new breakdown, the average annual outlay and share of the household budget for pensions and Social Security for households at the lowest levels of education were below those found in the old breakdown. The variation in income sources may explain some of the variation in outlays for pensions and Social Security.

Conclusions and implications

With the release of calendar year 2012 CE data, classification of household expenditures by the education of the reference person breakdown was replaced by classification by the highest level of education attained by any consumer
unit (CU) member. The rationale for the change was that the highest level of education attained by any household member more accurately reflects income and spending patterns than does the education level of the reference person only.

A comparison of expenditures was made using the old and new breakdowns. The new breakdown reduced the proportion of households in the less-than-college-graduate section, with the greatest reduction in the less-than-high-school-and-high-school-graduate classifications. With the exception of the master’s, professional, doctoral degree classification in the college-graduate section, pretax income and annual expenditures were lower in the new breakdown.

In both breakdowns, pretax income and total annual expenditures increased with level of education. Spending on most items followed similar patterns in both breakdowns. One exception was outlay for pensions and Social Security in the less-than-high-school and high-school-graduate classification which was lower in dollar amount and share of the household budget in the new breakdown, compared with the old.

Wages and salaries, the largest component of most households’ pretax income, is a reflection of the value of the productivity the marketplace assigns to a worker. Michael’s neutrality model also assumes that education increases efficiency in all nonmarket activities and that its influence is neutral (has the same effect on each activity).\(^5\) This greater efficiency increases a household’s real income at any given level of money income, thus increasing a household’s ability to purchase goods and services. Michael hypothesized that the increase in real income associated with increased education would result in proportionately higher outlays on luxury goods—but proportionately lower outlays on necessities.

Existing research using CE data provides partial support for Michael’s neutrality model, indicating that the relationship between education and household expenditures is significant, but complex. Michael, using data from the 1960–1961 CE found that, controlling for the effects of income and other factors, education was associated with a proportionately greater outlays on food away from home, household operations, leisure (recreation), and education, which were classified as luxuries. Of the items classified as necessities, education was associated with a proportionately lower outlay on food at home, tobacco, and personal care.\(^6\) Abdel-Ghany and Foster, using data from the 1972–1973 CE, also found that, controlling for the effects of income and other factors, education was associated with a proportionately greater outlay on household operations, recreation (leisure), and education and proportionately lower outlay on tobacco and utilities.\(^7\) Because of the nature of the data examined in this article, whether education has an influence on spending separate from its association with household income cannot be determined.

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- “An overview of science, technology, engineering, and mathematics (STEM) groups”

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Notes

1. For example, in 2012, median weekly earnings for full-time workers age 25 and over were $471 for those without a high school diploma, $652 for high school graduates (no college), and $1,735 for those with a professional degree, such as medicine or law. For more information, see “Earnings and unemployment rates by educational attainment,” (Bureau of Labor Statistics, May 23, 2013), www.bls.gov/emp/ep_chart_001.htm.

Data from the Census Bureau’s 2011 American Community Survey were used to estimate work-life earnings—the expected earnings over a 40-year time period for the population age 25-64 who maintain full-time, year-round employment for the entire period. Median earnings were $936,000 for workers with an eighth grade education or less, compared with $1,371,000 for those with a high school degree, but no college classes and $4,159,000 for those with a professional degree. For more information, see Tiffany Julian, “Work-Life Earnings by Field of Degree and Occupation for People with a Bachelor’s Degree: 2011” (U.S. Census Bureau, October 2012), www.census.gov/prod/2012pubs/acsbr11-04.pdf.

2. The reference person is the first household member mentioned by the respondent when asked to “Start with the name of the person or one of the persons who owns or rents the home.” It is with respect to this person that the relationship of the other consumer unit members is determined. In two-parent families, the reference person can be male or female. In one-parent families, the gender of the reference person is usually that of the sole parent.

3. In the Consumer Expenditure Survey (CE), the consumer unit is the entity on which expenditure reports are collected. Consumer units include families, single persons living alone or sharing a household with others but who are financially independent, or two or more persons living together who share expenses. While “consumer unit” is the proper technical term for the purposes of the CE, “household” or “family” often is used interchangeably for convenience. This article will use “household” instead of consumer unit. For more information, see the BLS Handbook of Methods, chapter 16, “Consumer Expenditures and Income,” www.bls.gov/opub/hom/homch16.htm.

4. The proportion of married couples where the husband has more education than the wife decreased, while the proportion where the husband and wife had the same level of education remained about the same. For more information, see Rebecca Chenevert, “Changing Levels of Spousal Education and Labor Force Supply,” Working Paper 2012-22 (U.S. Census Bureau, 2012) www.census.gov/people/laborforce/publications/Chenevert_MEA2012.pdf.

