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Missing Data in Imputed Highest Grade Completed in the 2015 -2018 NBER CPS Extracts

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DISCUSSION PAPER SERIES

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Extracts**

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ABSTRACT

Missing Data in Imputed Highest Grade Completed in the 2015–2018 NBER CPS Extracts

In 2015, the Current Population Survey (CPS) eliminated three questions related to educational attainment. These questions are used by the NBER to calculate the variable, “Imputed Highest Grade Completed” (*ihigrdc*) in their Monthly Outgoing Rotation Group (MORG) extracts. Imputed Highest Grade Completed provides a convenient measure of years of education and is based on the credential oriented CPS variable that is coded from 31 to 46. Because the NBER continues to use coding that relies on these eliminated questions to calculate *ihigrdc*, this variable has a missing value for 27.5% of the observations in the 2015–2018 extracts. These missing values, in turn, lead to an average Imputed Highest Grade Completed of about 1.2 fewer years after 2014 than would result from using the whole CPS. We informed the NBER of this issue in January 2019; however, because this variable with missing values remains on their website for download as of this writing (July 15, 2019), we are posting this working paper to inform users of these data so that they may address the issue appropriately in their own work.

JEL Classification: C18, C8, C810, J00, J01, I2

Keywords: current population survey, education, monthly outgoing rotation group, National Bureau of Economic Research data, missing data, coding errors, NBER

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1. Introduction

In 2015 the Bureau of Labor Statistics (BLS) and the United States Census Bureau modified questions related to educational attainment in the Current Population Survey (CPS). In particular, a question regarding the length of a person's master's program was eliminated, as well as questions that asked people with bachelor's degrees if they had ever taken graduate or professional courses, and if they had completed six or more of those courses.

We have found that this change in the CPS has generated effects that should be addressed when using data obtained from the CPS Merged Outgoing Rotation Groups (MORG), compiled by the National Bureau of Economic Research (NBER).¹ As part of course activities in two classes in which we used the NBER MORG extract,² we discovered that the revision to the CPS affected coding used by the NBER to calculate their variable, "Imputed Highest Grade Completed" (*ihigrdc*). Imputed Highest Grade Completed is based on the credential oriented CPS variable *grade92* (*peeduca* in the original CPS data), that is coded from 31 to 46. Specifically, the CPS variable collapses into four categories those with less than 9th grade education, and codes degrees without corresponding years of schooling for those with more than 11th grade education. Thus, the imputed years of education provided in the NBER MORG extract provides a convenient measure of years of education. Because the NBER coding continues to use prior coding to calculate this variable, the omission of these questions from the CPS results in a substantial number of missing values for *ihigrdc*.

Upon discovering this problem, we notified the NBER on January 25, 2019 of the large number of missing values for *ihigrdc* and described what we believed to be the source of the

¹ "CPS Merged Outgoing Rotation Groups," *National Bureau of Economic Research*, last accessed July 12, 2019, <https://www.nber.org/data/morg.html> [<https://perma.cc/QX7E-ULSZ>].

² Vanderbilt Law School Ph.D. courses: Econometrics for Legal Research; Labor Markets and Human Resources II.

missing values. An exchange of emails on January 28, 2019 appeared to confirm the source of our concern. However, as of this writing (July 15, 2019), the 2015–2017 MORG extract using the unmodified coding remains on the NBER website. The 2018 extract, which was posted after January 28, 2019 and also uses unmodified coding, also remains on the NBER website.

The problem is readily apparent in Table 1. When observing the tabulated data for the *ihigrdc* variable between 2011 and 2018, 27.5% of the data has a missing value recorded between the years of 2015 and 2018. In sharp contrast, none of the data has a missing value recorded between 2011 and 2014. Upon further inspection, we find that the entirety of the 2015–2018 missing values corresponds to individual bachelor’s degrees (e.g., BA, AB, BS) and master’s degrees (e.g., MA, MS, Meng, Med, MSW, MBA). One immediate consequence of using these data is a substantial underestimation of years of education if based on *ihigrdc*. The error results in an underestimation of approximately 1.2 years of education when using MORG data after 2014.

2. CPS Questions

In January 2015, the BLS and the U.S. Census Bureau modified the CPS to add questions on certifications and licenses.³ As part of this process, they eliminated other questions to ensure the survey was not more cumbersome for respondents. Three educational attainment questions that had been added in 1996 were eliminated after the two bureaus determined that “[d]ata from these questions had never been published by BLS, and a literature review found very few publications using the questions.” The eliminated questions are the following:

1. Since completing your bachelor’s degree, have you ever taken any graduate or professional school courses for credit? [Asked of people whose

³ Mary Dorinda Allard, “Adding Questions on Certifications and Licenses to the Current Population Survey,” *Monthly Labor Review*, U.S. Bureau of Labor Statistics, last accessed July 1, 2018, <https://doi.org/10.21916/mlr.2016.52> [<https://perma.cc/TB87-HL8N>].

- highest educational attainment was a bachelor's degree] (*grprof* in the original CPS data, *pegrprof* in the MORG data, see Table 2)
2. Did you complete six or more graduate or professional school courses? [Asked of people who responded "yes" to the previous question] (*gr6cor* in the original CPS data, *pegr6cor* in the MORG data, see Table 3)
 3. Was your master's degree program a 1-year, 2-year, or 3-year program? [Asked of people whose highest educational attainment was a master's degree] (*pems123* in the original CPS data, *ms123* in the MORG data, see Table 4)

3. Imputing Highest Grade Completed

In the NBER's data dictionary, the NBER imputes the variable *ihigrdc*, following the method described in Jaeger (2002).⁴ The NBER has offered this variable since 1998 in order to have a comparable measure to the "highest grade completed" variable available before 1992. The NBER's current method, which uses the questions that were eliminated in 2015, was intended to add precision to the years of education measure for those who have bachelor's or master's degrees.

The *ihigrdc* measure takes on values within the 0–18 range, with professional and doctoral degrees receiving a value of 18. Jaeger (2002)'s method establishes that "[z]ero through six post-B.A. courses are assumed to constitute one year and are assigned a highest grade completed of 17." Individuals who took more than six post-bachelor's courses are assigned a value of 18. Furthermore, individuals with one-year master's degree programs are assigned 17, and those from 2- or 3-year programs are assigned a value of 18.

A review of the NBER code to generate *ihigrdc* reveals its reliance on the existence of the variables *gr6cor* and *ms123* in order to generate the values 17 and 18.⁵ Because *gr6cor* and

⁴ Daniel Feenberg and Jean Roth, "CPS Labor Extracts 1979–2006," *National Bureau of Economic Research*, last accessed July 1, 2018, <https://www.nber.org/morg/docs/cpsx.pdf> [<https://perma.cc/75X8-42ZX>].

⁵ NBER MORG documentation, last accessed July 15, 2018, <https://www.nber.org/morg/sources/annual2015.log> [<https://perma.cc/6KRT-P93P>], <https://www.nber.org/morg/sources/annual2016.log> [<https://perma.cc/7E3H-8B4W>],

ms123 have not been available since 2014, the code leads 27.5% of observations, all of which should have been coded as 17 or 18, to have missing values.

The next question is how to correct for this issue. The goal of Jaeger (2002) regarding these questions was to obtain a more accurate measure for educational attainment for those with post-graduate studies. For the March 1998 sample, he shows that the average highest grade completed is 0.11 grades higher when using his method, as opposed to using only the “highest degree received” question without taking into account any post-BA course work that does not result in an additional degree.

In order to ascertain the magnitude of the omission, we first replicate the method used by the NBER to calculate *ihigrdc* as a baseline. This replication can be found in Tables 5 through 8, under the columns headed as “MORG.” We have subsequently generated a modified version of the code, in which we have changed only the imputation for observations relying on the eliminated questions, which we have labeled as “Modified.”⁶

We first set out to see the variation caused by the change in method using 2011 to 2014 data in order to establish how much change is attributable to the method change. For this period, and considering all observations, Jaeger’s method allows us to find an average highest grade completed of 13.438 years, while our modified method gives us an average of 13.280 years. The difference ranges between 0.153 and 0.160 in these years, as can be seen in Table 5. This difference increases to 0.184 (ranging between 0.181 and 0.187), when restricting the data to

<https://www.nber.org/morg/sources/annual2017.log> [<https://perma.cc/657Y-VXES>].
<https://www.nber.org/morg/sources/annual2018.do>.

⁶ Considering that Jaeger (2002) makes use of other educational attainment questions that continue to be available after the 2015 changes, our modified calculation remains identical to the MORG data for all questions that have remained unchanged. This leads to no changes in the imputed highest grade completed for observations with *ihigrdc* values ranging between 0–15. Therefore, all changes can be found amongst those within the 16–18 range. Specifically, bachelor’s degree is assigned 16 years; master’s degree is assigned 17 years; professional school and doctorate degrees are assigned 18 years. The complete coding we used to create our “Modified” variable is provided in Figure 1.

individuals between the ages of 25 and 64 (Table 6). While this number is greater than the 0.11 that Jaeger (2002) finds when implementing his method, our modified method still partially follows his method, when possible, particularly with respect to the attainment of high school diplomas through traditional methods or by way of a GED. Considering that this adjustment for GED-obtained degrees will have a negative effect on the imputed highest completed degree variable, our calculations appear reasonable.

Focusing on the period of interest, 2015 to 2018, we find that the differences are understandably greater. As shown in Table 7, the omission of 27.5% of the observations that were at the higher end of the spectrum translates to an underestimation of highest grade completed by 1.091 grades on average—ranging between 1.065 and 1.115 on a per-year basis. Restricting for ages 25 to 64 once again leads to a larger difference, with an average of 1.208 grades for the 2015 through 2018 period (Table 8). Considering that our modified method results in a highest completed degree variable with a lower average than the one generated by the NBER method (as shown in Tables 5 and 6), the average underestimation would likely be between 1.37 and 1.39 years of education, or approximately 10% of the actual value.

4. Conclusion

Accounting for the 2015 changes to the educational attainment questions in the CPS—particularly the questions related to post-graduate studies for individuals with bachelor’s degrees—is critical. Because these changes remain unaccounted for by the NBER in their widely-used CPS MORG data, 27.5% of their observations contain missing values for their Imputed Highest Grade Completed variable, *ihigrdc*. These missing values, in turn, lead to an average Imputed Highest Grade Completed of about 1.2 fewer years than would result from

using the whole data set. Ultimately, our intent is to make users of these data aware of this crucial issue, so that they may address the issue appropriately in their own work.

Table 1: Number of Observations Corresponding to Each Imputed Highest Grade of School Completed (*ihigrdc*) 2011–2018

| <i>ihigrdc</i> | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|----------------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0 | 1,083 | 1,102 | 968 | 971 | 1,009 | 1,033 | 930 | 953 |
| 2.5 | 2,107 | 2,093 | 1,954 | 2,043 | 2,075 | 1,974 | 1,807 | 1,724 |
| 5.5 | 4,024 | 3,894 | 3,729 | 3,715 | 3,706 | 3,625 | 3,384 | 3,237 |
| 7.5 | 6,986 | 6,456 | 6,224 | 6,177 | 5,920 | 5,741 | 5,426 | 4,956 |
| 9 | 8,129 | 7,665 | 7,493 | 7,384 | 7,394 | 7,108 | 6,709 | 6,368 |
| 10 | 13,087 | 12,577 | 12,046 | 11,810 | 11,734 | 11,526 | 11,026 | 10,239 |
| 11 | 15,725 | 15,258 | 14,584 | 14,551 | 14,360 | 13,639 | 13,345 | 12,707 |
| 12 | 103,348 | 100,996 | 100,120 | 100,751 | 98,937 | 97,934 | 95,287 | 92,690 |
| 13 | 22,284 | 22,425 | 22,037 | 22,059 | 21,315 | 21,359 | 20,412 | 19,454 |
| 14 | 39,074 | 38,808 | 39,480 | 39,311 | 39,826 | 40,470 | 40,608 | 39,860 |
| 15 | 9,840 | 10,025 | 9,857 | 9,846 | 9,798 | 9,800 | 9,501 | 9,171 |
| 16 | 45,508 | 46,507 | 47,940 | 49,063 | 5,789 | 5,838 | 5,722 | 5,553 |
| 17 | 6,483 | 6,541 | 6,568 | 6,523 | 0 | 0 | 0 | 0 |
| 18 | 40,656 | 42,061 | 42,717 | 42,852 | 9,196 | 9,304 | 9,272 | 9,358 |
| (missing) | 0 | 0 | 0 | 0 | 83,633 | 85,522 | 86,560 | 86,062 |
| Total | 318,334 | 316,408 | 315,717 | 317,056 | 314,692 | 314,873 | 309,989 | 302,332 |

Source: NBER MORG Data 2011–2018.

Note: The columns under each year heading report the number of observations in each cell.

Table 2: Completed any Graduate or Professional School Courses 2011–2018

| grprof | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 (yes) | 16,501 | 17,098 | 16,804 | 16,164 | 0 | 0 | 0 | 0 |
| 2 (no) | 40,154 | 40,984 | 42,073 | 43,032 | 0 | 0 | 0 | 0 |
| (missing) | 261,679 | 258,326 | 256,840 | 257,860 | 314,692 | 314,873 | 309,989 | 302,332 |
| Total | 318,334 | 316,408 | 315,717 | 317,056 | 314,692 | 314,873 | 309,989 | 302,332 |

Source: NBER MORG Data 2011–2018.

Note: The columns under each year heading report the number of observations in each cell.

Table 3: Completed 6 or more Graduate or Professional School Courses 2011–2018

| gr6cor | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 (yes) | 11,833 | 12,441 | 12,131 | 11,569 | 0 | 0 | 0 | 0 |
| 2 (no) | 4,668 | 4,657 | 4,673 | 4,595 | 0 | 0 | 0 | 0 |
| (missing) | 301,833 | 299,310 | 298,913 | 300,892 | 314,692 | 314,873 | 309,989 | 302,332 |
| Total | 318,334 | 316,408 | 315,717 | 317,056 | 314,692 | 314,873 | 309,989 | 302,332 |

Source: NBER MORG Data 2011–2018.

Note: The columns under each year heading report the number of observations in each cell.

Table 4: Duration of Master's Degree Programs 2011–2018

| ms123 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 1,815 | 1,884 | 1,895 | 1,928 | 0 | 0 | 0 | 0 |
| 2 | 14,207 | 14,662 | 15,113 | 15,431 | 0 | 0 | 0 | 0 |
| 3 | 6,189 | 6,234 | 6,611 | 6,766 | 0 | 0 | 0 | 0 |
| (missing) | 296,123 | 293,628 | 292,098 | 292,931 | 314,692 | 314,873 | 309,989 | 302,332 |
| Total | 318,334 | 316,408 | 315,717 | 317,056 | 314,692 | 314,873 | 309,989 | 302,332 |

Source: NBER MORG Data 2011–2018.

Note: The columns under each year heading report the number of observations in each cell. Values of *ms123* in years.

Table 5: Distribution of Imputed Highest Grade Completed 2011–2014

| Imputed Highest Grade Completed | 2011 | | 2012 | | 2013 | | 2014 | | All | |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified |
| 0 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| 2.5 | 0.007 | 0.007 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 |
| 5.5 | 0.013 | 0.013 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 |
| 7.5 | 0.022 | 0.022 | 0.020 | 0.020 | 0.020 | 0.020 | 0.019 | 0.019 | 0.020 | 0.020 |
| 9 | 0.026 | 0.026 | 0.024 | 0.024 | 0.024 | 0.024 | 0.023 | 0.023 | 0.024 | 0.024 |
| 10 | 0.041 | 0.041 | 0.040 | 0.040 | 0.038 | 0.038 | 0.037 | 0.037 | 0.039 | 0.039 |
| 11 | 0.049 | 0.049 | 0.048 | 0.048 | 0.046 | 0.046 | 0.046 | 0.046 | 0.047 | 0.047 |
| 12 | 0.325 | 0.325 | 0.319 | 0.319 | 0.317 | 0.317 | 0.318 | 0.318 | 0.320 | 0.320 |
| 13 | 0.070 | 0.070 | 0.071 | 0.071 | 0.070 | 0.070 | 0.070 | 0.070 | 0.070 | 0.070 |
| 14 | 0.123 | 0.123 | 0.123 | 0.123 | 0.125 | 0.125 | 0.124 | 0.124 | 0.124 | 0.124 |
| 15 | 0.031 | 0.031 | 0.032 | 0.032 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 |
| 16 | <i>0.143</i> | <i>0.195</i> | <i>0.147</i> | <i>0.201</i> | <i>0.152</i> | <i>0.205</i> | <i>0.155</i> | <i>0.206</i> | <i>0.149</i> | <i>0.202</i> |
| 17 | <i>0.020</i> | <i>0.070</i> | <i>0.021</i> | <i>0.072</i> | <i>0.021</i> | <i>0.075</i> | <i>0.021</i> | <i>0.076</i> | <i>0.021</i> | <i>0.073</i> |
| 18 | <i>0.128</i> | <i>0.026</i> | <i>0.133</i> | <i>0.028</i> | <i>0.135</i> | <i>0.028</i> | <i>0.135</i> | <i>0.029</i> | <i>0.133</i> | <i>0.028</i> |
| Mean | 13.355 | 13.202 | 13.423 | 13.264 | 13.482 | 13.322 | 13.491 | 13.334 | 13.438 | 13.280 |
| Mean Difference | 0.153 | | 0.159 | | 0.160 | | 0.157 | | 0.158 | |
| N | 318,334 | | 316,408 | | 315,717 | | 317,056 | | 1,267,515 | |

Source: Calculations from weighted 2011–2014 NBER MORG Data.

Note: “MORG” refers to the variable *ihigrdc* from the original data set. “Modified” refers to the modified imputed value that does not use the educational attainment questions excluded since 2015.

Table 6: Distribution of Imputed Highest Grade Completed 2011–2014, Ages 25–64

| Imputed Highest Grade Completed | 2011 | | 2012 | | 2013 | | 2014 | | All | |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified |
| 0 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| 2.5 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.006 | 0.006 | 0.006 | 0.006 |
| 5.5 | 0.013 | 0.013 | 0.013 | 0.013 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 | 0.012 |
| 7.5 | 0.015 | 0.015 | 0.015 | 0.015 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 | 0.014 |
| 9 | 0.018 | 0.018 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 | 0.017 |
| 10 | 0.024 | 0.024 | 0.024 | 0.024 | 0.023 | 0.023 | 0.022 | 0.022 | 0.023 | 0.023 |
| 11 | 0.032 | 0.032 | 0.031 | 0.031 | 0.030 | 0.030 | 0.030 | 0.030 | 0.031 | 0.031 |
| 12 | 0.311 | 0.311 | 0.305 | 0.305 | 0.303 | 0.303 | 0.303 | 0.303 | 0.306 | 0.306 |
| 13 | 0.068 | 0.068 | 0.069 | 0.069 | 0.067 | 0.067 | 0.067 | 0.067 | 0.068 | 0.068 |
| 14 | 0.133 | 0.133 | 0.133 | 0.133 | 0.135 | 0.135 | 0.133 | 0.133 | 0.133 | 0.133 |
| 15 | 0.030 | 0.030 | 0.030 | 0.030 | 0.029 | 0.029 | 0.029 | 0.029 | 0.030 | 0.030 |
| 16 | <i>0.172</i> | <i>0.232</i> | <i>0.176</i> | <i>0.238</i> | <i>0.181</i> | <i>0.242</i> | <i>0.185</i> | <i>0.242</i> | <i>0.178</i> | <i>0.238</i> |
| 17 | <i>0.023</i> | <i>0.084</i> | <i>0.023</i> | <i>0.086</i> | <i>0.023</i> | <i>0.088</i> | <i>0.023</i> | <i>0.090</i> | <i>0.023</i> | <i>0.087</i> |
| 18 | <i>0.152</i> | <i>0.031</i> | <i>0.156</i> | <i>0.031</i> | <i>0.157</i> | <i>0.032</i> | <i>0.156</i> | <i>0.032</i> | <i>0.155</i> | <i>0.031</i> |
| Mean | 13.759 | 13.577 | 13.807 | 13.620 | 13.855 | 13.669 | 13.858 | 13.677 | 13.819 | 13.636 |
| Mean Difference | 0.182 | | 0.187 | | 0.186 | | 0.181 | | 0.184 | |
| N | 215,361 | | 212,848 | | 211,191 | | 210,574 | | 849,974 | |

Source: Calculations from weighted 2011–2014 NBER MORG Data.

Note: Individuals 25–64 years old. “MORG” refers to the variable *ihigrdc* from the original data set. “Modified” refers to the modified imputed value that does not use the educational attainment questions excluded since 2015.

Table 7: Distribution of Imputed Highest Grade Completed 2015–2018

| Imputed Highest Grade Completed | 2015 | | 2016 | | 2017 | | 2018 | | All | |
|---------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified |
| 0 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| 2.5 | 0.007 | 0.007 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 | 0.006 |
| 5.5 | 0.012 | 0.012 | 0.012 | 0.012 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 | 0.011 |
| 7.5 | 0.019 | 0.019 | 0.018 | 0.018 | 0.018 | 0.018 | 0.016 | 0.016 | 0.018 | 0.018 |
| 9 | 0.023 | 0.023 | 0.023 | 0.023 | 0.022 | 0.022 | 0.021 | 0.021 | 0.022 | 0.022 |
| 10 | 0.037 | 0.037 | 0.037 | 0.037 | 0.036 | 0.036 | 0.034 | 0.034 | 0.036 | 0.036 |
| 11 | 0.046 | 0.046 | 0.043 | 0.043 | 0.043 | 0.043 | 0.042 | 0.042 | 0.044 | 0.044 |
| 12 | 0.314 | 0.314 | 0.311 | 0.311 | 0.307 | 0.307 | 0.307 | 0.307 | 0.310 | 0.310 |
| 13 | 0.068 | 0.068 | 0.068 | 0.068 | 0.066 | 0.066 | 0.064 | 0.064 | 0.066 | 0.066 |
| 14 | 0.127 | 0.127 | 0.129 | 0.129 | 0.131 | 0.131 | 0.132 | 0.132 | 0.129 | 0.129 |
| 15 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.031 | 0.030 | 0.030 | 0.031 | 0.031 |
| 16 | <i>0.018</i> | <i>0.207</i> | <i>0.019</i> | <i>0.209</i> | <i>0.018</i> | <i>0.216</i> | <i>0.018</i> | <i>0.219</i> | <i>0.018</i> | <i>0.213</i> |
| 17 | <i>0.000</i> | <i>0.078</i> | <i>0.000</i> | <i>0.081</i> | <i>0.000</i> | <i>0.082</i> | <i>0.000</i> | <i>0.084</i> | <i>0.000</i> | <i>0.081</i> |
| 18 | <i>0.029</i> | <i>0.029</i> | <i>0.030</i> | <i>0.030</i> | <i>0.030</i> | <i>0.030</i> | <i>0.031</i> | <i>0.031</i> | <i>0.030</i> | <i>0.030</i> |
| (missing) | 0.266 | 0.000 | 0.272 | 0.000 | 0.279 | 0.000 | 0.285 | 0.000 | 0.275 | 0.000 |
| Mean | 12.286 | 13.351 | 12.315 | 13.397 | 12.351 | 13.452 | 12.377 | 13.492 | 12.332 | 13.422 |
| Mean Difference | | -1.065 | | -1.082 | | -1.101 | | -1.115 | | -1.091 |
| N | 314,692 | | 314,873 | | 309,989 | | 302,332 | | 1,241,886 | |

Source: Calculations from weighted 2015–2018 NBER MORG Data.

Note: “MORG” refers to the variable *ihigrdc* from the original data set. “Modified” refers to the modified imputed value that does not use the educational attainment questions excluded since 2015.

Table 8: Distribution of Imputed Highest Grade Completed 2015–2018, Ages 25–64

| Imputed Highest Grade Completed | 2015 | | 2016 | | 2017 | | 2018 | | All | |
|---------------------------------------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified | MORG | Modified |
| 0 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 |
| 2.5 | 0.006 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| 5.5 | 0.012 | 0.012 | 0.012 | 0.012 | 0.011 | 0.011 | 0.011 | 0.011 | 0.012 | 0.012 |
| 7.5 | 0.015 | 0.015 | 0.014 | 0.014 | 0.013 | 0.013 | 0.013 | 0.013 | 0.014 | 0.014 |
| 9 | 0.017 | 0.017 | 0.017 | 0.017 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 | 0.016 |
| 10 | 0.022 | 0.022 | 0.023 | 0.023 | 0.022 | 0.022 | 0.020 | 0.020 | 0.022 | 0.022 |
| 11 | 0.031 | 0.031 | 0.028 | 0.028 | 0.029 | 0.029 | 0.028 | 0.028 | 0.029 | 0.029 |
| 12 | 0.298 | 0.298 | 0.296 | 0.296 | 0.293 | 0.293 | 0.290 | 0.290 | 0.294 | 0.294 |
| 13 | 0.065 | 0.065 | 0.065 | 0.065 | 0.062 | 0.062 | 0.061 | 0.061 | 0.063 | 0.063 |
| 14 | 0.135 | 0.135 | 0.137 | 0.137 | 0.139 | 0.139 | 0.139 | 0.139 | 0.138 | 0.138 |
| 15 | 0.030 | 0.030 | 0.030 | 0.030 | 0.029 | 0.029 | 0.028 | 0.028 | 0.029 | 0.029 |
| 16 | 0.020 | 0.242 | 0.021 | 0.244 | 0.020 | 0.250 | 0.020 | 0.255 | 0.020 | 0.247 |
| 17 | 0.000 | 0.092 | 0.000 | 0.095 | 0.000 | 0.095 | 0.000 | 0.097 | 0.000 | 0.095 |
| 18 | 0.033 | 0.033 | 0.033 | 0.033 | 0.034 | 0.034 | 0.034 | 0.034 | 0.033 | 0.033 |
| (missing) | 0.314 | 0.000 | 0.318 | 0.000 | 0.324 | 0.000 | 0.332 | 0.000 | 0.322 | 0.000 |
| Mean | 12.496 | 13.687 | 12.526 | 13.725 | 12.560 | 13.771 | 12.582 | 13.814 | 12.540 | 13.748 |
| Mean Difference | | -1.191 | | -1.199 | | -1.211 | | -1.232 | | -1.208 |
| N | 207,681 | | 206,883 | | 201,995 | | 195,514 | | 812,073 | |

Source: Calculations from weighted 2015–2018 NBER MORG Data.

Note: Individuals 25–64 years old. “MORG” refers to the variable *ihigrdc* from the original data set. “Modified” refers to the modified imputed value that does not use the educational attainment questions excluded since 2015.

Figure 1: Comparison between NBER and Modified Stata Code

| NBER MORG code | Modified code |
|--|--|
| <pre> generate double ihigrdc = . ** Jaeger label var ihigrdc "Imputed highest grade completed" replace ihigrdc = 0 if grade92==31 replace ihigrdc = 2.5 if grade92==32 replace ihigrdc = 5.5 if grade92==33 replace ihigrdc = 7.5 if grade92==34 replace ihigrdc = 9 if grade92==35 replace ihigrdc =10 if grade92==36 replace ihigrdc =11 if grade92==37 replace ihigrdc =12 if grade92==38 replace ihigrdc = 0 if grade92==39 & ged==2 & gedhigr==1 replace ihigrdc = 2.5 if grade92==39 & ged==2 & gedhigr==2 replace ihigrdc = 5.5 if grade92==39 & ged==2 & gedhigr==3 replace ihigrdc = 7.5 if grade92==39 & ged==2 & gedhigr==4 replace ihigrdc = 9 if grade92==39 & ged==2 & gedhigr==5 replace ihigrdc = 10 if grade92==39 & ged==2 & gedhigr==6 replace ihigrdc = 11 if grade92==39 & ged==2 & gedhigr==7 replace ihigrdc = 12 if grade92==39 & ged==2 & gedhigr==8 replace ihigrdc = 12 if ged==1 replace ihigrdc = 12 if grade92>=40 & grade92<=42 & yrcoll==1 replace ihigrdc = 13 if grade92>=40 & grade92<=42 & yrcoll==2 replace ihigrdc = 14 if grade92>=40 & grade92<=42 & yrcoll==3 replace ihigrdc = 15 if grade92>=40 & grade92<=42 & yrcoll==4 replace ihigrdc = 16 if grade92>=40 & grade92<=42 & yrcoll==5 replace ihigrdc = 16 if grade92==43 & grprof==2 replace ihigrdc = 17 if grade92==43 & gr6cor==2 replace ihigrdc = 18 if grade92==43 & gr6cor==1 replace ihigrdc = 17 if grade92==44 & ms123==1 replace ihigrdc = 18 if grade92==44 & ms123>=2 & ms123<. replace ihigrdc = 18 if grade92==45 grade92==46 </pre> | <pre> generate double Modified = . replace Modified = ihigrdc replace Modified = 16 if grade92==43 replace Modified = 17 if grade92==44 </pre> |

Source: NBER Code is obtained from the NBER MORG documentation, last accessed July 15, 2018, <https://www.nber.org/morg/sources/annual2015.log> [<https://perma.cc/6KRT-P93P>], <https://www.nber.org/morg/sources/annual2016.log> [<https://perma.cc/7E3H-8B4W>], <https://www.nber.org/morg/sources/annual2017.log> [<https://perma.cc/657Y-VXES>], <https://www.nber.org/morg/sources/annual2018.do>.