Creating a Microdata Extract

**Exercise**

**Objective:** Use the IPUMS Terra website to obtain a customized dataset that can be used to answer research questions. This exercise will use microdata and aggregate data for the United States spanning two decades to explore trends in education and employment.
IPUMS Terra: Microdata Extract Overview

RESEARCH QUESTION

Examine the interoperable (microdata and area-level) datasets for United States over three decennial censuses. What trends exist over time in education and unemployment?

OBJECTIVES

- Create a IPUMS Terra account
- Create and download a IPUMS Terra microdata extract
- Use IPUMS Terra to attach area-level data to microdata records

IPUMS TERRA VARIABLES

**Microdata variables**

* COUNTRY: Country
EDUCUS: Educational attainment, United States
EMPSTAT: Activity status (employment status)
GEOLEV2: 2nd subnational geographic level, world
HHWT: Household weight
* PERNUM: Person number
PERSONS: Number of person records in household
* PERWT: Person weight
* SAMPLE: IPUMS sample identifier
SCHOOL: School attendance
* SERIAL: Household serial number
* YEAR: Year

* Denotes preselected variables

**Area-level variables**

UNEMP: Percent of population unemployed in each census area
PROF: Percent of population in professional or technical occupation
EDATTAIN: Percent of population with a specific educational attainment in each census area
DATA TYPE DESCRIPTIONS

Microdata

Microdata provide individual-level information describing characteristics such as age, sex, and occupation. Each microdata record includes the responses to all questions asked in a census or survey for a specific individual. Individual records are nested within households, with full information about the interrelationships of the members of each household. Each dataset is a sample of households from a particular census or survey.

Area-level

Area-level data describe geographic units defined by boundaries. Geographic units are grouped in sets, such as the counties of the United States or the states of Brazil. In IPUMS Terra, these sets of units are referred to as geographic levels. The data are structured as tables, with a row for each unit and a column for each variable. For example, you may have a table with a row for each county in the United States and columns containing the number of males and the number of females in each county.
REGISTERING WITH IPUMS TERRA

IPUMS uses a common user management system covering all IPUMS products: IPUMS Terra, IPUMS International, IPUMS USA, IPUMS CPS, IPUMS Higher Ed, IPUMS NAPP, IPUMS NHGIS, IPUMS Health Surveys, and IPUMS Time Use. If you have an existing account with any of these systems, you will use the same account for IPUMS Terra.

- Go to https://data.terrapop.org/
- If you have an existing IPUMS account, click Login. After logging in, you will be directed to the registration page for IPUMS Terra.
- If you do not have an IPUMS account, click on Sign up to register for access.

Step 1
Sign up

Step 2
Registration
with IPUMS
International

- Fill out the online form and check the license boxes

Note: All registered IPUMS Terra users have access to U.S. microdata, since IPUMS Terra provides the public version of the microdata made available by the U.S. Census Bureau. To access microdata for other countries, you must submit an application to IPUMS International. You can do so by clicking the box next to “Check here if you would like access to Microdata” on the IPUMS Terra registration form, and filling out the additional fields that appear. Approval by IPUMS International may take one or two days. If you already have an IPUMS International account, your IPUMS Terra account will automatically be linked to it, and you will be able to access international microdata through IPUMS Terra. For more help see page 16.

APPLICATION TO USE RESTRICTED MICRODATA

IPUMS Terra makes IPUMS International microdata available free of charge, but their use imposes responsibilities upon the user. To access the data, a prospective user must submit an electronic authorization form (this form) identifying the user by name, electronic address, and institutional affiliation. The investigator must state the purpose of the proposed project and agree to abide by the regulations specified below. If multiple investigators are involved in a project, all must register separately.
Step 3
Email confirmation and log in

After you have registered with IPUMS Terra, an e-mail will be sent to your account notifying you of approval. 
*Note: Please be sure to check your trash/spam folders*
- Open the e-mail and click on the confirmation link. You will then be logged into IPUMS Terra

The extract builder website guides researchers through the workflows for building data extracts. Choose the type of data structure you would like to receive as output for further analysis. In this tutorial, we will be creating a microdata extract with attached area-level variables.

- Click on the "Start Extract" button for Microdata Output

![Microdata Output](image)

![Area-level Output](image)

![Raster Data Output](image)
The IPUMS Terra interface for the first step of the workflow consists of the following elements:

**Navigation Bar:** Shows the major steps in the workflow, the sub-steps of the current step, and your progress through the workflow. The navigation bar steps will reflect the workflow you select. The step and sub-step you are currently on are highlighted in green.

**Data Cart:** Provides a summary of the data you have selected to include in your extract. The data cart is updated as you make selections throughout the workflow.

**Availability Grid:** Shows the availability of variables by dataset and enables selection of variables and datasets.

**Variables Panel:** Lists topics for which microdata variables are available. Clicking on a topic will populate the rows of the availability grid with the variables in that topic.

**Datasets Panel:** Lists countries in the IPUMS Terra system, and provides options to filter by time and hide countries without microdata. Clicking on a continent will list the countries in the continent. Clicking on a country will populate the columns of the availability grid with the datasets available for that country. You may add all countries in a continent to the grid by clicking the “Browse All” line.
Step 6
Browse datasets for the United States

- Click on North America in the Browse Datasets panel.

The listing ‘United States (7)’ indicates that 7 years of data are available for the US.

Step 7
Select datasets

- Click on United States.

The available datasets for United States appear as columns in the availability grid.
- Check the boxes to select years: 2000, 2010.
Step 8
Select microdata variables

To see available variables, choose a topic in the Browse Variables panel. Topics are organized into two categories, Household and Person, accessible via the tabs in the Browse Variables panel.

- Under the Household tab, choose the variable topic **Technical Household**.

The availability grid will be updated with available technical household variables.

Step 9
Select household variables

Five of the technical household variables are preselected, as indicated by the cart icon on the topic name and shown in the availability grid. These variables are usually important for analysis and are preselected for convenience. These variables can be removed if you deem they are unnecessary.

- Remove the variable **FORMTYPE** since it is not available for our selected datasets.

Choose additional variables from the Technical Household topic:
- **PERSONS**
- **HHWT**

These variables are available for United States for the years 2000 and 2010.

The variables will be added to your Data Cart.
Step 10
Select household variables

- Select the Household topic **Geography Global**
  You can simplify the availability grid to show only the variables available in the datasets you are browsing.
- Uncheck "Display unavailable variables"
- Select **GEOLEV2**

Select Microdata

Select Data: [What is this?]

- Show only selected variables
- Show only selected datasets

Geography: Global Variables

- Display unavailable variables

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<tr>
<td>GEOLEV2</td>
<td>2nd subnational geographic level, world (consistent boundaries over time)</td>
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Step 11
Select person variables

- Under the Person tab, select the variable topic **Technical Person**.
  Three variables in this category are preselected.
- Unselect the variable **RESIDENT** as the data is unavailable (no green dots) for selected datasets. (You may need to check "Display unavailable variables")

Continue adding variables to your extract by selecting the following Person variables:

- Education → **EDUCUS**
- Education → **SCHOOL**
- Work → **EMPSTAT**
When you have selected both datasets and variables, the NEXT button will become active and turn green, allowing you to move on to the next step. The navigation bar indicates that the next step will be to Attach Area-Level Data.

- Click **NEXT** to move to the Area-Level data screen.

*Note: Attaching area-level data will add contextual variables to your microdata records. The contextual variables contain information about the geographic unit in which the individual lives.*

The datasets for which you selected microdata are pre-selected for area-level data.

- In the Browse Variables panel, click on “Education.” The availability grid will be updated with available education variables.

*Note: Area-level variables are organized in variable groups, which are similar to the columns in aggregate data tables. To see the individual variables within a group and access their metadata, use the arrow to expand the group.*

- Choose the variable group **EDATTAIN**, by checking the multi-select box. EDATTAIN is available for both selected datasets.

*Note: All four variables within the EDATTAIN group will be added to your Data Cart.*
Step 13
Select area-level variables

Select the following variables from the topic Employment
- **UNEMP**
- **PROF**

Step 14
Select a harmonized geographic level

Click **NEXT** to move to geographic selection

Our research question involves examining how education and employment have changed between 2000 and 2010. In order to study change over time, it is important to use geographic units with boundaries that are consistent over the time frame under study. In IPUMS Terra, such units are referred to as harmonized. If harmonized units are not used, apparent changes may be due to changing boundaries rather than actual changes in population characteristics.

- Leave **Harmonized (consistent)** selected
- Click **NEXT**
You have the option of selecting raster data to create additional contextual variables. The raster grid cells in each geographic unit are summarized to produce a value for the geographic unit, which is then attached to microdata records for the individuals in the unit.

This exercise does not involve raster data so we can just skip this step.
- Click **SKIP** to go to the Submit step

Before submitting your extract request, you should check your data cart. Two sections of the cart should be populated.
- Microdata should have 12 variables, 2 datasets
- Area-level type should have 6 variables, 2 datasets.
Step 15
Check data cart

You can click the number of variables or datasets for each data type to see detailed lists of your selections.
Step 16
Submit your extract

- Give your extract a short, descriptive Extract Title, maybe, “U.S. education and employment microdata.” The Extract Title will appear in your Extract History.
- If you want the GIS shapefiles for the geographic levels used in your extract, check the box to "Include boundary files." (Not required for this exercise.)
- Click Submit Extract

You will receive an email when the extract is ready.

Step 17
Download your extract

ipums@umn.edu
to me

Your IPUMS Terra extract 'U.S. education and employment microdata' is ready.

To retrieve your data, codebook, and command files, for Extract #3518, go to the link below.

https://data.terrapop.org/user/extract_requests

Thank you for your support.

Sincerely,
The IPUMS Terra Team
Step 17
Download your extract

To download the data, follow the link in the e-mail, which will take you to your account’s "Extract History" page as shown below.

The data will be delivered in a compressed format, make sure you have software available to extract the files.
IPUMS Terra users are able to access U.S. microdata without registering with IPUMS International. However, if you have international research interests the IPUMS International microdata collection will be of interest.

**Optional IPUMS International Registration**

**USAGE LICENSES**

**IPUMS TERRA USAGE LICENSE (AREA, RASTER AND BOUNDARY DATA)**

By completing this registration, you agree to the following terms of use.

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- **Citation:** Cite the IPUMS Terra data appropriately. (Required)
  
  For information on proper citation refer to [citation and use](#). Publications and research reports making use of IPUMS Terra should be added to our [Bibliography](#).

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