Presentation: Improved Research Access to Census Bureau Linked Administrative Data via Public-use Products

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Professor John M. Abowd, Director of the Labor Dynamics Institute, presented on "Improved Research Access to Census Bureau Linked Administrative Data via Public-use Products" at the 18th Annual Meetings of the Society of Labor Economists in Boston, MA, on Friday, May 3, 2013.
Improved Research Access to Census Bureau Linked Administrative Data via Public-use Products

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Cornell University
with a big assist from Abigail Cooke, Javier Miranda, Martha Stinson, and Kelly Trageser

May 3, 2013
Outline

• Why you should consider using synthetic data-seriously
• SIPP synthetic data
• LBD synthetic data
• OnTheMap/LODES data
• The Quarterly Workforce Indicators (not synthetic, but used a related technique)
Why Use Synthetic Data

• Most simple analyses give answers that are useful
• Most complex designs do not
• But, the Census Bureau developers have a feedback loop that allows you to get results from the underlying confidential data
• Whole process takes weeks, not years
• New releases of the synthetic data reflect the features discovered by the users
Feedback Loop

Scientific Modeling

Confidentiality Protection

Synthetic Data

User Analytical Validity Tests
SURVEY OF INCOME AND PROGRAM PARTICIPATION (SIPP) SYNTHETIC DATA
Genesis of the Synthetic SIPP

• Developed originally by a portion of the SIPP user community primarily interested in national retirement and disability programs

• SIPP augmented with
  – earnings histories from the IRS data maintained at SSA (W-2)
  – benefit data from SSA’s master beneficiary records.

• Feasibility assessment (confidentiality!) of adding SIPP variables to earnings/benefit data in a public-use file (PUF)
  – set of variables that could be added without compromising the confidentiality protection of the existing SIPP public use files was VERY limited

• Alternative methods explored
Basic Methodology

• Experiment using synthetic data (Rubin, 1993; Little, 1993)

• Partially synthetic data with multiple imputation of missing items (Reiter, 2004)

• Partially synthetic data:
  – Some variables are actual responses
  – Other variables are replaced by values sampled from the posterior predictive distribution for that record, conditional on all of the confidential data
Brief History of the Synthetic SIPP

• 2003-2005: Creation, but no release, of three versions of the “SIPP/SSA/IRS-PUF” (SSB)

• 2006: Release to limited public access of SSB V4.2
  – Access to general public only at Cornell-hosted Virtual RDC (SSB server: restricted-access setup)
  – Promise of evaluation of Virtual RDC-run programs on internal Gold Standard
  – Ongoing SSA evaluation
  – Ongoing evaluation at Census Bureau (including RDCs)

• 2010: Release of SSB V5 at Census and on the VirtualRDC (Synthetic Data Server, SDS)
  – Restructured to vastly improve analytical validity of SIPP variables

• 2013: Release of SSB V5.1 at Census and on the Cornell VirtualRDC (SDS)
  – Documentation in preparation (meta-data in CED²AR)
  – First user-initiated variables
Basic Structure of the SSB V4

• SIPP
  – Core set of 125 SIPP variables in a standardized extract of SIPP panels 1990-1993 and 1996
  – All missing data items (except for structurally missing) are marked for imputation

• IRS
  – Maintained at SSA, but derived from IRS records
  – Master summary earnings records (SER)
  – Master detailed earnings records (DER)
Basic Structure of the SSB V4 (II)

- SSA
  - Master Beneficiary Record (MBR)
- Census
  - Numident: administrative birth and death dates
- All files combined using verified SSNs

=> “Gold Standard”
Basic Structure of SSB V5

- Couple-level linkage: the first person to whom the SIPP respondent was married during the time period covered by the SIPP panel
- SIPP variables only appear in years appropriate for the panel indicated by the PANEL variable (biggest change from V4.2)
SIPP Synthetic Beta V5.1

- Available (really soon) through the Cornell Virtual RDC
- Includes 7 SIPP panels
- Administrative earnings history was edited to remove some erroneous reports prior to synthesis
- Adds many new SIPP variables that vary across months of the panel years: (user-requested variables: feedback loop!)
  - Weeks with job, weeks with pay
  - Usual hours worked
  - Survey-reported earnings
  - Total personal income
  - Health insurance coverage, any
  - Health insurance coverage, employer-provided
- Includes state of residence recorded in first SIPP interview
SIPP Synthetic Beta V6.0

• Expected Release: May 2014
• Added 1984 and 2008 panels
• Extend administrative earnings history through 2011
• Include children (under age 15)
• Include more SIPP and administrative disability variables
• Include a few characteristics of employers
Ongoing Research


• Developing link between parents and children in the Gold Standard File. (See also Gottschalk and Stinson, SOLE 2013 Friday 8AM, Beacon H)

• Research on how to synthesize these links to protect confidentiality so these data could be released.
External Researcher Validation

• Version 4
  – 12 projects
  – 1 was submitted for validation

• Version 5
  – 31 projects
  – 6 were submitted for validation
Validation Details

• Henriques, Alice (2102) “How does Social Security claiming respond to incentives? Considering husbands’ and wives’ benefits separately”


• Bertrand, Marianne, Emir Kamenica and Jessica Pan (2013) “Gender identity and relative income within households”
Timeline: SDS application November 2012, gold standard results January 2013
Welcome to the Comprehensive Extensible Data Documentation and Access Repository (CED²AR)

CED²AR is a National Science Foundation (NSF) funded project developed by the NSF Census Research Network - Cornell Node (NCRN).

It is designed to improve the documentation and discoverability of both public and restricted data from the federal statistical system.

To search across all datasets in the repository, enter a term in the search box above and click the ‘Search’ button.
CED²AR

CED²AR The Comprehensive Extensible Data Documentation and Access Repository

Document Description

Citation

Title Statement
Title: SSB
Production Statement

95 variables found.

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CED²AR

The Comprehensive Extensible Data Documentation and Access Repository

You are currently viewing metadata for SSB.
To view other datasets' metadata, remove this filter.

<< Back To List

hicov

Codebook: SSB
Producer:
Variable Name: hicov
Label: Health Insurance Coverage
Var Type: numeric
Values: 0 Respondent did not have health insurance coverage during this month
1 Respondent had health insurance coverage during this month
Sysmiss
CED$^2$AR

- Part of the NSF-Census Research Network
- Funded through NSF Grant #1131848
- Soon live, watch http://www.ncrn.cornell.edu (Cornell node) or http://www.ncrn.info (Network)
SYNTHETIC LONGITUDINAL BUSINESS DATABASE
Longitudinal Business Database

- Economic census covering nearly all private non-farm business establishments with paid employees
  - Annual payroll and Mar 12 employment (1976-2011)
  - SIC/NAICS
  - Geography (down to county),
  - Entry year, Exit year
  - Firm structure
- Used for looking at business dynamics, job flows, market volatility, international comparisons
- Most widely-used Census Bureau data set in RDCs
Synthetic LBD

• Synthetic data set
  – Available outside the Census RDC on Cornell VirtualRDC Synthetic Data Server
  – Provides analytical validity for dynamic establishment-level employment and payroll
  – Reduces the number of requests for special tabulations from the LND
  – Aids users applying for RDC access

• Experiment in public-use business micro-data
Creation of the Synthetic LBD


- Partially synthetic data
  - Employment, payroll, birth and death date of establishments, multi-unit status
  - Suppressed county, SIC released
  - 1976-2000
External Validation Exercises

- 41 approved projects (includes provisional approvals)
- 3 have submitted results for validation (one of these did two rounds of validation)
- One timeline: application approved March 2011, validation results released September 2011
- 14 projects denied because data not available (typically wanted NAICS, geography, firm id)
Validation Exercise Details

• Professor: fixed-effects regressions of establishment-level employment growth interacted with unemployment rate, by age, sector, and single/multi (into 2\textsuperscript{nd} round)

• Ph.D. student: turnover rates of establishments by industry, model with implications on concentration and exit/entry dynamics

• Ph.D. student: shape of the distribution of entering establishments at different points in time (into 3\textsuperscript{rd} round)
Ongoing Development Efforts

• SynLBD 2.x (x>0)
  – Same methodology as 2.0
  – Adds additional years (through 2011)
  – Based on NAICS (using back-coding by Shawn Klimek and Teresa Fort)
  – Data created, working on disclosure avoidance documentation

• SynLBD 3.0
  – Ongoing work by Kinney, Reiter
  – Adds synthesis of firm links, geography, based on NAICS
Access to SynLBD

• See
  https://www.census.gov/ces/dataproducts/synlbd/index.html and
  http://www.vrdc.cornell.edu/sds/
OTHER CENSUS BUREAU SYNTHETIC DATA PRODUCTS
OnTheMap/LODES

- **OnTheMap**
  - Workplace and residence coded to census block
  - Data for 2002-2010 (2011 soon)
  - Residence address is synthetic
  - All queries explicitly logged (permitting analysis on underlying confidential data by Census staff)

- **LODES**
  - Public-use data in tabular format
Quarterly Workforce Indicators

- Local labor market time series on employment, earnings, hiring, separation, job creations, job destructions
- Simpler confidentiality protection system (noise infusion)
- Based on linked unemployment insurance and QCEW data
- Age, sex, race, ethnicity, education, ownership, NAICS, CBSA, firm size, firm age all available for all variables
Lots More Information

- Cornell University Information Science 7470 Understanding Social and Economic Data
- Partially sponsored by the NSF-Census Research Network
- All materials, exercises, lecture videos online