DATA-INTENSIVE RESEARCH CONFERENCE

Pre-conference workshop presented by **IPUMS** and **NDiRA**

Longitudinal Data from IPUMS: IPUMS CPS

Renae Rodgers July 19, 2022

Linking CPS Data

Opportunities and Challenges





Opportunities

- Large sample sizes
- Good coverage of subpopulations
- Short-run changes in employment and families; reactions to births and losses (death, divorce)
- Combine rich sources of information about different topics
 - Work and volunteering; veterans and employment





Challenges

• Rotation pattern

• Linking keys

• Same variables with different codes

• Non-response





Challenges: Rotation Pattern

- CPS is NOT a longitudinal survey that follows one or several cohorts as they age
- CPS does have a panel component where individuals are observed up to 8 times over 16 months, but the way they move through the survey is in a 4-8-4 rotation





Defining Terms

- Rotation Pattern: The way households move through the CPS
- Month in sample (MIS): The term CPS uses to index where a household is in the CPS rotation pattern
- **CPS Cohort or Rotation Group**: The term we use to describe a group of households that started the CPS at the same time and move through the CPS together





Challenges: Rotation Pattern

- 4-8-4
- In 4 months
 - MIS 1, 2, 3, 4
- Out 8 months
 - No MIS values because not in survey
- In 4 months
 - MIS 5, 6, 7, 8

Month-in-sample – MIS The way CPS indexes where a household is in the CPS rotation pattern





Rotation Groups

- 8 rotation groups (cohorts) in the sample during every month
- In every month, 1/8 of sample is interviewed for the
 - First time
 - Second time
 - ... Eighth (last) time
- The 1/8 interviewed for the first time replaces the 1/8 interviewed for the last time in the previous month
- Rotation groups 4 & 8 are called "outgoing rotation groups" because they are exiting the survey





Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
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	A6										
		A7									
			A 8								





Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5											
	A6										
		A7									
			A 8								

	Year X													
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
A1	B1													
	A2	B2												
		A3												
			A4											

Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5											
	A6										
		A7									
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Year X													
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		
A1	B1												
	A2	B2											
		A3	B3										
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Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5											
	A6										
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			A8								



Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5											
	A6										
		A7									
			A 8								



Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5	B 5										
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Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5	B 5										
	A6	B 6									
		A7									
			A 8								



Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5	B 5										
	A6	B 6									
		A7	B7								
			A 8								



Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A5	B 5										
	A6	B 6									
		A7	B7								
			A8	B8							

	Year X													
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec			
A1	B1	C1	D1	E1	F1	G1	H1	11	J1	K1	L1			
Z2	A2	B2	C2	D2	E2	F2	G2	H2	12	J2	K2			
Y3	Z3	A3	B 3	C3	D3	E3	F3	G3	H3	13	JЗ			
X4	Y4	Z4	A4	B4	C4	D4	E4	F4	G4	H4	14			
O5	P5	Q5	R5	S5	Т5	U5	V5	W5	X5	Y5	Z5			
ZZ6	O6	P6	Q6	R6	S6	Т6	U6	V6	W6	X6	Y6			
YY7	ZZ7	07	P7	Q7	R7	S7	Т7	U7	V7	W7	X7			
XX8	YY8	ZZ8	O8	P8	Q8	R8	S8	Т8	U8	V8	W8			

Year X+1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
AA1	BB1	CC1	DD1	EE1	FF1	GG1	HH1	ll1	JJ1	KK1	LL1
L2	AA2	BB2	CC2	DD2	EE2	FF2	GG2	HH2	112	JJ2	KK2
K3	L3	AA3	BB3	CC3	DD3	EE3	FF3	GG3	HH3	113	JJ3
J4	K4	L4	AA4	BB4	CC4	DD4	EE4	FF4	GG4	HH4	114
A5	B5	C5	D5	E5	F5	G5	H5	15	J5	K5	L5
Z6	A6	B6	C6	D6	E6	F6	G6	H6	16	J6	K6
Y7	Z7	A7	В7	C7	D7	E7	F7	G7	H7	17	J7
X8	Y8	Z8	A8	B 8	C8	D8	E8	F8	G8	H8	18

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L2	AA <mark>2</mark>	BB <mark>2</mark>	CC2	DD <mark>2</mark>	EE <mark>2</mark>	FF <mark>2</mark>	GG <mark>2</mark>	HH <mark>2</mark>	112	JJ <mark>2</mark>	KK <mark>2</mark>
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A <mark>5</mark>	B5	C5	D5	E5	F5	G <mark>5</mark>	H5	15	J <mark>5</mark>	K5	L5
Z <mark>6</mark>	A <mark>6</mark>	B6	C6	D6	E <mark>6</mark>	F6	G <mark>6</mark>	H <mark>6</mark>	16	J <mark>6</mark>	K <mark>6</mark>
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Year X											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
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ZZ6	O6	P6	Q6	R6	S6	Т6	U6	V6	W6	X6	Y6
YY7	ZZ7	07	P7	Q7	R7	S7	Т7	U7	V7	W7	X7
XX8	YY8	ZZ8	08	P8	Q8	R8	S8	Т8	U8	V8	W8
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Year X

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L2	AA2	BB2	CC2	DD2	EE2	FF2	GG2	HH2	112	JJ2	KK2
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Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
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Y3	Z3	A3	B3	C3	D3	E3	F3	G3	H3	13	J3
X4	Y4	Z4	A4	B4	C4	D4	E4	F4	G4	H4	14
O5	P5	Q5	R5	S5	Т5	U5	V5	W5	X5	Y5	Z5
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K3	L3	AA3	BB3	CC3	DD3	EE3	FF3	GG3	HH3	113	JJ3
J4	K4	L4	AA4	BB4	CC4	DD4	EE4	FF4	GG4	HH4	114
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Z2	A2	B2	C2	D2	E2	F2	G2	H2	12	J2	K2
Y3	Z3	A3	B3	C3	D3	E3	F3	G3	H3	13	J3
X4	Y4	Z4	A4	B4	C4	D4	E4	F4	G4	H4	14
O5	P5	Q5	R5	S5	Т5	U5	V5	W5	X5	Y5	Z5
ZZ6	O6	P6	Q6	R6	S6	Т6	U6	V6	W6	X6	Y6
YY7	ZZ7	07	P7	Q7	R7	S7	Т7	U7	V7	W7	X7
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K3	L3	AA3	BB3	CC3	DD3	EE3	FF3	GG3	HH3	113	JJ3
J4	K4	L4	AA4	BB4	CC4	DD4	EE4	FF4	GG4	HH4	114
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AS	B5	C5	D5	E5	F5	G5	H5	15	J5	K5	L5
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			D5	E5	F5	G5	H5	15	J5	K5	

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Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1
Z2	A2	B2	C2	D2	E2	F2	G2	H2	12	J2	K2
Y3	Z3	A3	B3	C3	D3	E3	F3	G3	H3	13	J3
X4	Y4	Z4	A4	B4	C4	D4	E4	F4	G4	H4	14
O5	P5	Q5	R5	S5	Т5	U5	V5	W5	X5	Y5	Z5
ZZ6	O6	P6	Q6	R6	S6	Т6	U6	V6	W6	X6	Y6
YY7	ZZ7	07	P7	Q7	R7	S7	Т7	U7	V7	W7	X7
XX8	YY8	ZZ8	08	P8	Q8	R8	S8	Т8	U8	V8	W8
					Year	· X+1					
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L2	AA2	BB2	CC2	DD2	EE2	FF2	GG2	HH2	112	JJ2	KK2
K3	L3	AA3	BB3	CC3	DD3	EE3	FF3	GG3	HH3	113	JJ3
J4	K4	L4	AA4	BB4	CC4	DD4	EE4	FF4	GG4	HH4	114
A5	B5	C5	D5	E5	F5	G5	H5	15	J5	K5	L5
Z6	A6	B6	C6	D6	E6	F6	G6	H6	16	J6	K6
Y7	Z7	A7	B7	C7	D7	E7	F7	G7	H7	17	J7

Year X



Challenges: Rotation Pattern

- Enter IPUMS CPS <u>RoPES</u>
- Motivation
 - Easily see CPS rotation pattern
 - Explore what topical supplements can be examined together



https://cps.ipums.org/cps/

IPUMS CPS

CURRENT POPULATION SURVEY

HOME | SELECT DATA | MY DATA | SUPPORT



IPUMS CPS

ABOUT REGISTER DONATE TO IPUMS

DATA

BROWSE AND SELECT DATA ANALYZE DATA ONLINE DOWNLOAD OR REVISE MY DATA

DOCUMENTATION

COVID-19 AND CPS SAMPLE DESCRIPTIONS TECHNICAL DOCUMENTS LINKING THE CPS REVISION HISTORY

SUPPORT

FAQ VIDEO TUTORIALS C USER FORUM C TRAINING MATERIALS

RESEARCH

CURRENT POPULATION SURVEY DATA FOR SOCIAL, ECONOMIC AND HEALTH RESEARCH

IPUMS CPS harmonizes microdata from the monthly U.S. labor force survey, the Current Population Survey (CPS), covering the period 1962 to the present. Data include demographic information, rich employment data, program participation and supplemental data on topics such as fertility, tobacco use, volunteer activities, voter registration, computer and internet use, food security, and more.

USE IT FOR GOOD -- NEVER FOR EVIL



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2018												
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2021												
	12.5%	**** ********************************	37.5%	** **** 50%	*** 37.5%	**** 25%	12.5%					-



Challenges

Rotation pattern

• Linking keys

• Same variables with different codes

• Non-response





Challenges: Linking Keys

- Changes in variables needed to link
 - Technical changes
 - Privacy protection changes
- Duplicate and recycled identifiers
 - Feng 2001
 - Flood et al. 2020





Challenges: Linking Keys

January 1976 to December 1993	January 1994 to April 2004	May 2004 +
HRHHID	HRHHID	HRHHID
PULINENO	PULINENO	PULINENO
STATEFIPS	STATEFIPS	STATEFIPS
HUHHNUM	HUHHNUM	
	HRSAMPLE	HRHHID2
	HRSERSUF	





Challenges: Linking Keys

- CPSID(P) an IPUMS-created unique identifier
- Bridges changes in variable names as well as the technical aspects of how to link
- Available for 1976 forward
- <u>Drew, Flood, & Warren, 2014</u> Journal of Economic and Social Measurement
- Flood et al., (forthcoming) Journal of Economic and Social Measurement





CPSID(P) Limitations

- Mechanical
 - Created solely based on Census Bureau linking keys
 - Does NOT condition on AGE, SEX, RACE
- Not available for all respondents in ASEC
 - only those who are also in the March BMS
- Cannot overcome unlinkable files & unlinkable records

IPUMS

• See Flood et al., 2020 for details



Challenges

Rotation pattern

• Linking keys

• Same variables with different codes

• Non-response





Challenges: Same variables, different codes

- IPUMS!
- Harmonized across time to deal with changes in codes
- Use it for good, never for evil!
 - (Also, please cite us!)





Challenges

Rotation pattern

• Linking keys

• Same variables with different codes



• Non-response





Challenges: Non-response

- Households that were eligible to participate in CPS but did not because of
 - Non-response (at any point in the rotation)
 - Death
 - Migration
- Imputation





Challenges

Rotation pattern

- Linking keys
- Same variables with different codes

Non-response



Future Linking Work & Further Resources





Future Linking Work

• Upcoming CPS linking features from IPUMS

- Make ASEC oversamples linkable using CPSIDP
- A version of CPSIDP that is validated on AGE, SEX, RACE matches
 - Coming very soon!





Further Resources

- Rivera Drew, J. A., Flood, S., & Warren, J. R. (2014). Making full use of the longitudinal design of the Current Population Survey: Methods for linking records across 16 months. *Journal of economic and social measurement*, *39*(3), 121-144.
- Flood, S. M., & Pacas, J. D. (2017). Using the annual social and economic supplement as part of a current population survey panel. *Journal of Economic and Social Measurement*, 42(3-4), 225-248.
- Flood, S., Rodgers, R., Pacas, J., Kristiansen, D., & Klaas, B. (2020). Extending current population survey linkages: Obstacles and solutions for linking monthly data from 1976 to 1988. *Journal of Economic and Social Measurement*, (Preprint), 1-28.
- <u>CPS Linking Workshop Materials</u>
- <u>CPS ASEC Longitudinal Extracts</u>



Questions?

