



Understanding Society

THE UK HOUSEHOLD LONGITUDINAL STUDY

## Quality of Expenditure Data Collected with a Receipt Scanning App in a Probability Household Panel

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# Acknowledgements



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- ▶ National Centre for Research Methods (NCRM)
- ▶ In collaboration with Kantar Worldpanel

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# Study aims




Collect high-quality data on monthly expenditure

- ▶ in the context of a general-purpose household panel survey:  
The UK Household Longitudinal Study (UKHLS)


How good are data collected with a **receipt scanning app** compared to benchmark data?

# Study design



- ▶ *Understanding Society* Innovation Panel
  - ▶ Stratified, clustered random sample of HHs in Great Britain
- ▶ Adults aged 16+ invited to download receipt scanning app
  - ▶ After annual household interview
  - ▶ Invited by letter and email
  - ▶ Use app for one month
  - ▶ Own smartphone or tablet (iOS or Android)
- ▶ App tasks
  - ▶ Scan shopping receipt
  - ▶ Report spending in app
  - ▶ Report no purchases today
- ▶ Fieldwork: Oct-Dec 2016


# Study design



- ▶ Incentives
  - ▶ For app download
  - ▶ Per day app used
  - ▶ Bonus for using app for one month
  - ▶ Max. total: £30.50 ( $\approx$  \$40) / £34.50 ( $\approx$  \$45)
- ▶ Participation rate
  - ▶ 12.8% used app at least once ( $n = 270$ )
  - ▶ 81.5% of app users remain in the study for 29+ days

Jäckle et al. (2017): Participation in a mobile app survey to collect expenditure data as part of a large-scale probability household panel: response rates and response biases, [Understanding Society Working Paper, 2017-09](#)

# Research questions



1. **Total expenditure** in app compared to benchmark?
2. **Category expenditure** in app compared to benchmark?
3. **Direct entry option** important for which categories?
4. Which **types of participants** responded well to app task?
5. Different **substantive conclusions** when using app data compared to benchmark?

## UK Living Costs and Food Survey (LCF)

- ▶ Main survey on household expenditure in UK
- ▶ Stratified, clustered random sample of HHs in UK
- ▶ Adults aged 16+ invited to complete paper spending diary following the HH interview
- ▶ Response rate: 45% of HHs completed interview + at least 1 diary

# Differences between app and benchmark study

## UKHLS App Study

- ▶ Receipt scanning app
- ▶ General-purpose survey
- ▶ Collect data on total expenditure
- ▶ Diary period: four weeks
- ▶ Excluding Northern Ireland
- ▶ Oct-Dec 2016
  
- ▶ N = 259

## Living Costs and Food Survey

- ▶ Paper spending diary
- ▶ Expenditure survey
- ▶ Collect data on item-level expenditure
- ▶ Diary period: two weeks
- ▶ Including Northern Ireland
- ▶ Apr 2016-Mar 2017
  
- ▶ N = 2,213

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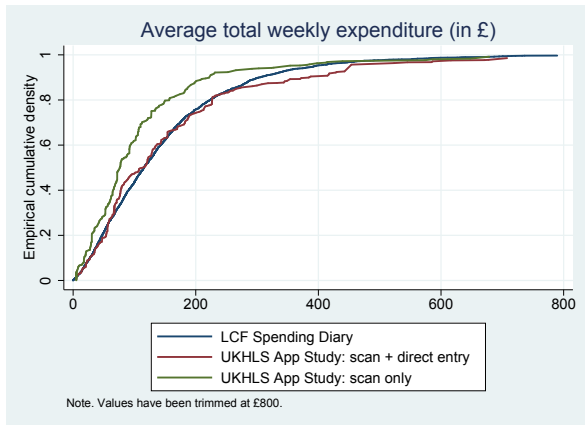
# Method

Inverse probability weighting to match sample composition of app study to benchmark data

Sample composition after IPW		
	LCF	App-LCF
Mean Age	50.0	-0.4
% Female	51.7	-3.3
% Employed	58.7	-5.6
% Income Q1	26.0	-5.5
Q2	23.8	-3.4
Q3	24.4	+5.7
Q4	25.9	+3.2
% House owned	72.4	-0.5
Mean HH size	2.6	-0.1
Mean # children in HH	0.6	-0.1
% Urban	75.5	+2.7
% Computer in HH	92.1	+3.5

# Results

## Total expenditure



	Mean	SD	Q1	Median	Q3	N	KS-test
LCF	148.2	131.4	56.7	115.5	196.6	2,213	
Scan+DE	165.6	187.1	57.2	115.8	209.2	259	n.s.
Scan only	116.7	149.4	41.5	76.1	127.7	236	***

# Results

## Category expenditure

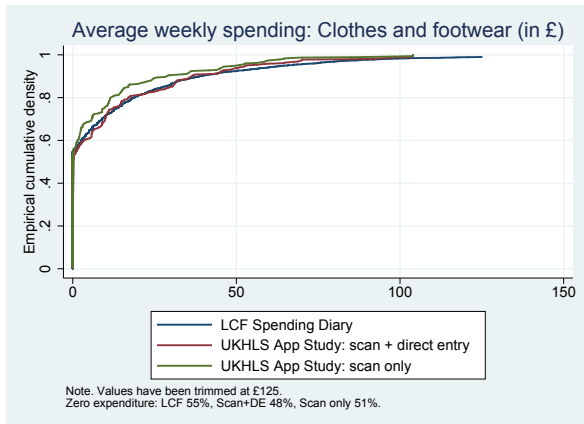


### Coding of scanned receipts

1. Data from images manually entered into database by Kantar Worldpanel
2. Automated category assignment for each item
  - ▶ Item description parsed
  - ▶ Compared against consumption classification COICOP
  - ▶ Recoded into spending categories used in app
3. Category assignment manually checked

# Results

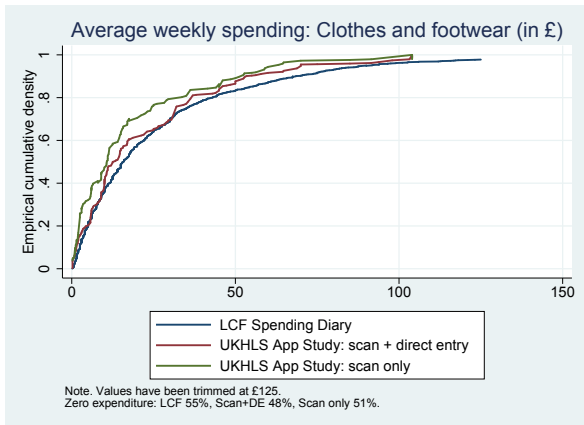
## Category expenditure



	Mean	SD	Q1	Median	Q3	N	KS-test
LCF	12.8	30.4	0.0	0.0	13.5	2,213	
Scan+DE	11.3	20.6	0.0	0.0	12.5	259	n.s.
Scan only	8.6	17.8	0.0	0.0	9.8	236	n.s.

# Results

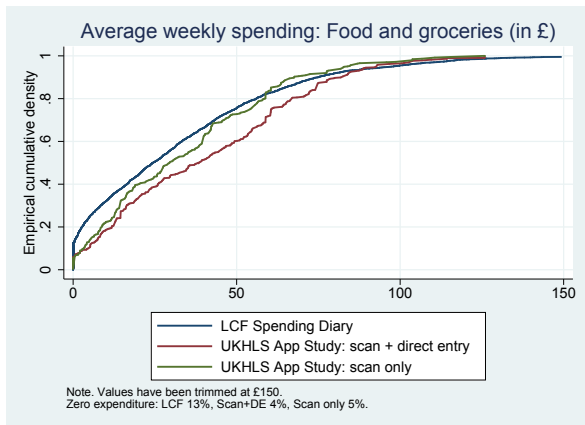
## Category expenditure



	Mean	SD	Q1	Median	Q3	N	KS-test
LCF	28.5	40.1	6.0	15.8	35.0	999	
Scan+DE	23.1	24.5	5.9	13.3	32.0	134	n.s.
Scan only	18.7	22.3	2.5	10.7	24.5	115	***

# Results

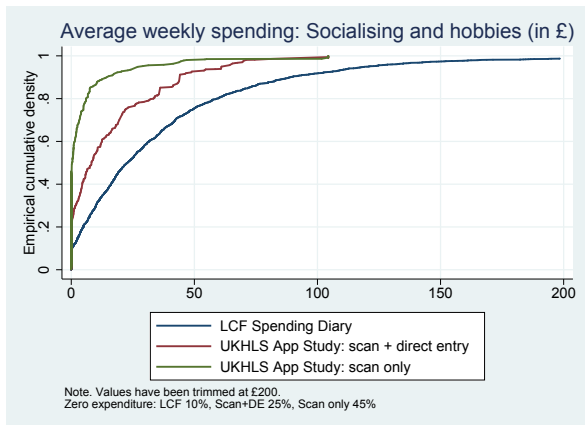
## Category expenditure



	Mean	SD	Q1	Median	Q3	N	KS-test
LCF	32.3	32.3	5.1	24.4	49.4	2,213	
Scan+DE	40.9	30.2	14.6	38.3	60.8	259	***
Scan only	34.3	27.0	12.9	29.7	54.1	236	**

# Results

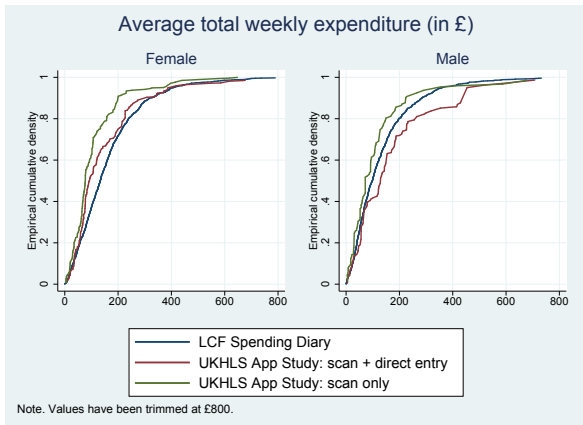
## Category expenditure



	Mean	SD	Q1	Median	Q3	N	KS-test
LCF	37.8	51.4	7.5	22.8	49.4	2,213	
Scan+DE	16.6	21.2	0.8	8.3	22.0	259	***
Scan only	5.8	15.1	0.4	0.4	4.9	236	***

# Results

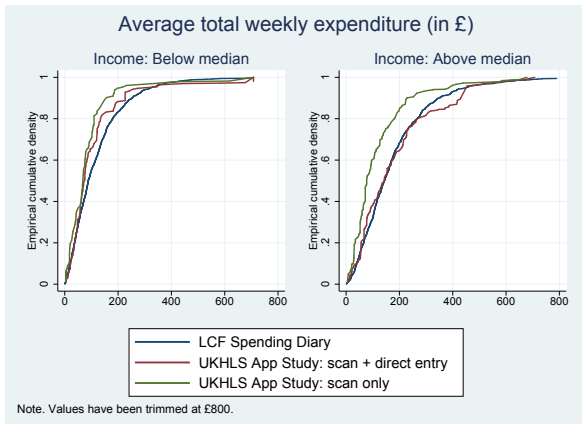
## Total expenditure by subgroup



	Female			Male		
	Median	N	KS-test	Median	N	KS-test
LCF	133.3	1,144		98.4	1,069	
Scan+DE	92.6	160	**	129.6	99	*
Scan only	77.3	149	***	71.9	87	n.s.

# Results

## Total expenditure by subgroup



	Income: Below median			Income: Above median		
	Median	N	KS-test	Median	N	KS-test
LCF	88.1	1,102		143.8	1,111	
Scan+DE	74.2	102	*	143.3	157	n.s.
Scan only	68.1	91	***	77.3	145	***

# Conclusions



- ▶ Promising method for collecting high-level expenditure data in general population
- ▶ Total expenditure (scan + direct entry) comparable to benchmark (LCF)
- ▶ Category expenditure more comparable for some categories than for others
- ▶ Direct entry option important for most categories
- ▶ Expenditure more comparable for men and those with higher income

## How to increase participation in mobile data collection?


- ▶ Browser-based alternative to app (sequential mixed-mode)
- ▶ Experiment #1: Invitation to use app
  - ▶ Within interview vs. letter plus email
- ▶ Experiment # 2: Feedback on reported expenditure
  - ▶ Show cumulative summary of expenditure by category
  - ▶ Feedback promised vs. feedback not promised vs. no feedback

## More information



Project webpage

<https://www.iser.essex.ac.uk/research/projects/understanding-household-finance-through-better-measurement>



Thank you.

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