

# Improving Consumer Payments Measurement with the Diary of Consumer Payment Choice

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# Success & Challenge for the DCPC

- **Success:**

- *Aggregate DCPC payments match aggregate PCE consumption in comparable expenditure categories. (CEX equals 63% of PCE<sup>1</sup>)*

- <sup>1</sup> Schuh, S., Measuring Consumer Expenditures with Payment Diaries, 2016.

- **Challenge:**

- *Despite measuring all the detailed components of cash (currency) holdings and transactions, DCPC estimates do not consistently satisfy the implied dynamic relationship among these concepts.*

# Comparison of DCPC to other surveys & diaries

	DCPC	SCPC	CEX-S	CEX-D	FCS
<b>Sponsor</b>	Boston Fed	Boston Fed	BLS	BLS	RAND Corp.
<b>Frequency</b>	Irregular, 2012, 2015	Annual, 2008-present	Quarterly, 1980-present	Quarterly, 1980-present	Annual 2008-2014
<b>Response unit(s)</b>	Consumers	Consumers	Consumer units	Consumer units	Households
<b>Sample size</b>	~2,000	~2,000	~7,000	~7,000	~2,500
<b>Sampling frame</b>	ALP, UAS, GfK, Qualtrics	ALP, UAS, GfK, Qualtrics	Internal	Internal	ALP
<b>Survey mode(s)</b>	Internet & various memory aids	Internet	Interview (CAPI)	Interview with paper memory aid	Internet
<b>Method of data collection</b>	Recording + Recall	Recall	Recall	Recording + Recall	Recall
<b>Unit(s) of measure</b>	Amount spent per payment each day	# of payments in a typical period	Amount spent per category recently	Total cost for each daily item purchased	Amount spent per category recently
<b>Reference period of measurement</b>	Daily (three consecutive days, randomly assigned)	Respondents choose week, month, or year	Usual week, month, or quarter depending on category	Daily (one week)	Past month or quarter, depending on category
<b>Response format of questions</b>	Open-ended (respondents provide \$ values)	Open-ended (respondents provide \$ values)	Open-ended (respondents provide \$ values)	Open-ended (respondents provide \$ values)	Open-ended (respondents provide \$ values)
<b>Incentives</b>	\$60	\$20	\$0	\$0	\$20
<b>Strategy for reducing or correcting response errors in real-time</b>	Reconciliation screen while entering purchases	Range checks	Experimented with cash-flow reconciliation in Koop and Nhien (2012), but not implemented.	N/A	Reconciliation screen at end of survey

Sample page from Diary of Consumer Payment Choice

**DAY 1 – DAILY PAYMENTS AND CASH ACTIVITY**

- It's OK if you don't make any purchases today. Just tell us when you go online tonight. We're interested in all types of payment behavior, even 0 purchases.
- We will ask you about any bills and cash deposits online.
- Please write today's date in the space provided \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Please circle the Payment Method codes to tell us what you carried out of the house today.	<b>P1 P2 P3 P4/P5 P6 P9 P10</b>	<b>I did not leave the house today.</b> <input type="checkbox"/>
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Time	Amount Spent	Payment Method	Location	Device	Merchant Type	Merchant Name
____ am ____ pm	\$ _____.	P	L	D	M	
____ am ____ pm	\$ _____.	P	L	D	M	
____ am ____ pm	\$ _____.	P	L	D	M	

**Payment Method Codes**

- |                                  |                                 |
|----------------------------------|---------------------------------|
| P1: Cash                         | P7: Bank account number payment |
| P2: Check                        | P8: Online banking bill payment |
| P3: Credit card                  | P9: Money order                 |
| P4: Debit card (Used PIN)        | P10: Traveler's check           |
| P5: Debit card (Did not use PIN) | P11: Text message payment       |
| P6: Prepaid/Gift/EBT card        | P12: Other payment method       |

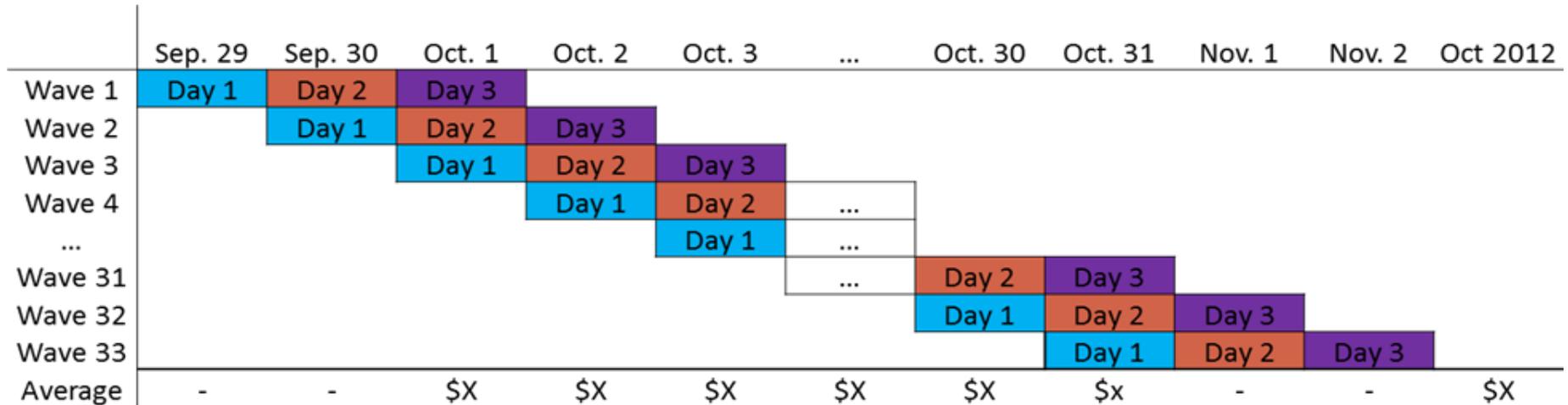
**Location Codes**

- |                       |                           |
|-----------------------|---------------------------|
| L1: Payment in person | L2: Payment not in person |
|-----------------------|---------------------------|

**Device Codes**

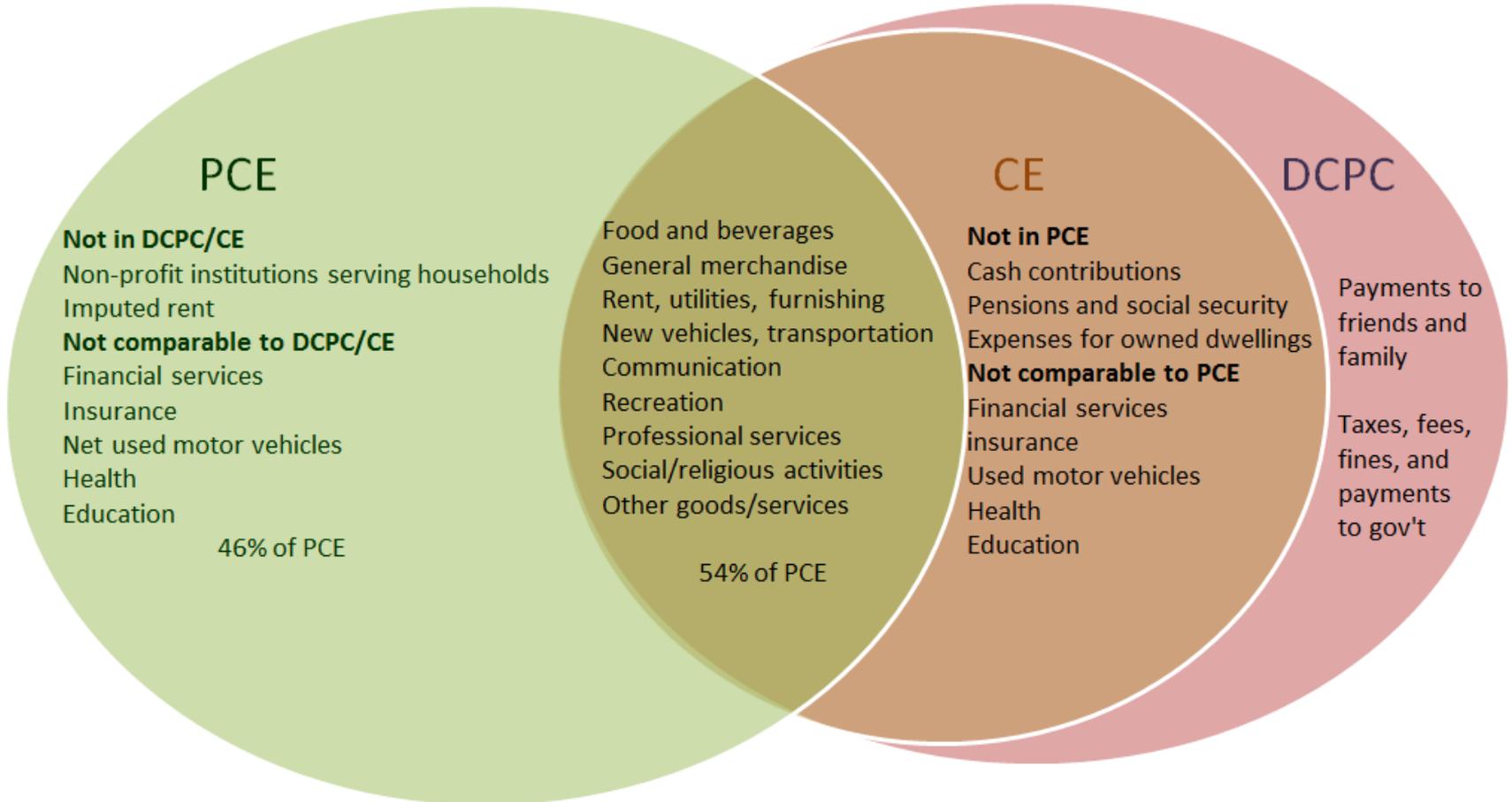
- |                                  |                              |
|----------------------------------|------------------------------|
| D1: Computer (laptop or desktop) | D4: Landline phone           |
| D2: Tablet (e.g., iPad, Kindle)  | D5: Mail or delivery service |
| D3: Mobile phone                 | D6: None of the above        |

# Sampling methodology



- Each wave is selected randomly from the population so each **day**, **wave**, and the entire **month** is **representative** of the US consumer
- New respondents start every day
- On any day in the diary month, there are respondents on Days 1, 2, and 3 of their diaries.
  - This helps smooth out any potential daily bias caused by diary fatigue.

# Expenditure coverage comparison



PCE = Personal Consumption Expenditures from the National Income & Product Accounts (NIPA)

	DCPC (unlimited)	CEX-S	CEX-D (unlimited)	FCS
All categories				
Comparable categories				
Food and beverages	3	9	20	2
General merchandise, recreation, communication	8	95	10	7
Rent, utilities, furnishing	5	77	1	11
New vehicles, transportation	6	50	2	
Professional and other services	4	4		5
Other goods/services	6	37	3	5
Non-comparable categories				
Financial services and insurance	2	13		4
Used motor vehicles	1	10		1
Health	2	17	1	3
Education	1	10	1	1
Social services and religious activities	1	4		1
Unique categories				
Final consumption expenditures of nonprofit institutions serving households (NPISH)				
Imputed rent				
Cash contributions including alimony and child support		3		
Expenditures for owned dwellings	3	30	2	3
Friends and family	1			
Other people (excluding people who provide goods and services)	1			1
Taxes, fees, fines, and other payments to governments	1	Sales taxes for various purchases		1
Unknown	1			7

# Aggregate consumer expenditure estimates, October 2012 (\$millions)

Expenditure categories	PCE	CE	FCS	DCPC
All	11,051	6,398	4,925	9,718
(Percentage of PCE)	(100%)	(58%)	(45%)	(88%)
Directly comparable	5,920	3,721	2,747	5,981
(Percentage of PCE)		(63%)	(46%)	(101%)
Food and beverages	1,534	876	823	1,778
General merchandise, recreation, communication	1,961	902	585	1,647
Rent, utilities, furnishing	980	893	599	1,264
New vehicles, transportation	1,009	722	472	849
Professional and other services	170	Not broken out in Table 1300	Not collected	175
Other goods/services	265	328	269	268
Approximately comparable	3,553	1,415	829	1,734
(Percentage of PCE)	(100%)	(40%)	(23%)	(49%)
Financial services and insurance	789	890	375	1070
Used motor vehicles	97	189	50	112
Health	2,266	186	202	328
Education	253	150	157	110
Social services and religious activities	147.2		45	114

# Cash flow in a recall survey

$$C_{t+1,i} = C_{ti} + W_{ti} - D_{ti}$$

$t = \text{month}, i = \text{one household}$

- Townsend Thai Monthly Survey<sup>1</sup> (TTMS) attempts to measure household cash flow by asking cash balances, withdrawals, and deposits on a monthly frequency.
  - <sup>1</sup> Samphantharak, K. and Townsend, R.M., *Households as Corporate Firms*, 2010.
- This approach encountered relatively large measurement errors in Thailand.  $C$ ,  $W$ ,  $D$  are often estimates.
- There are additional cultural issues in Thailand involving reporting cash holdings to interviewers.

# Cash flow in a payment diary

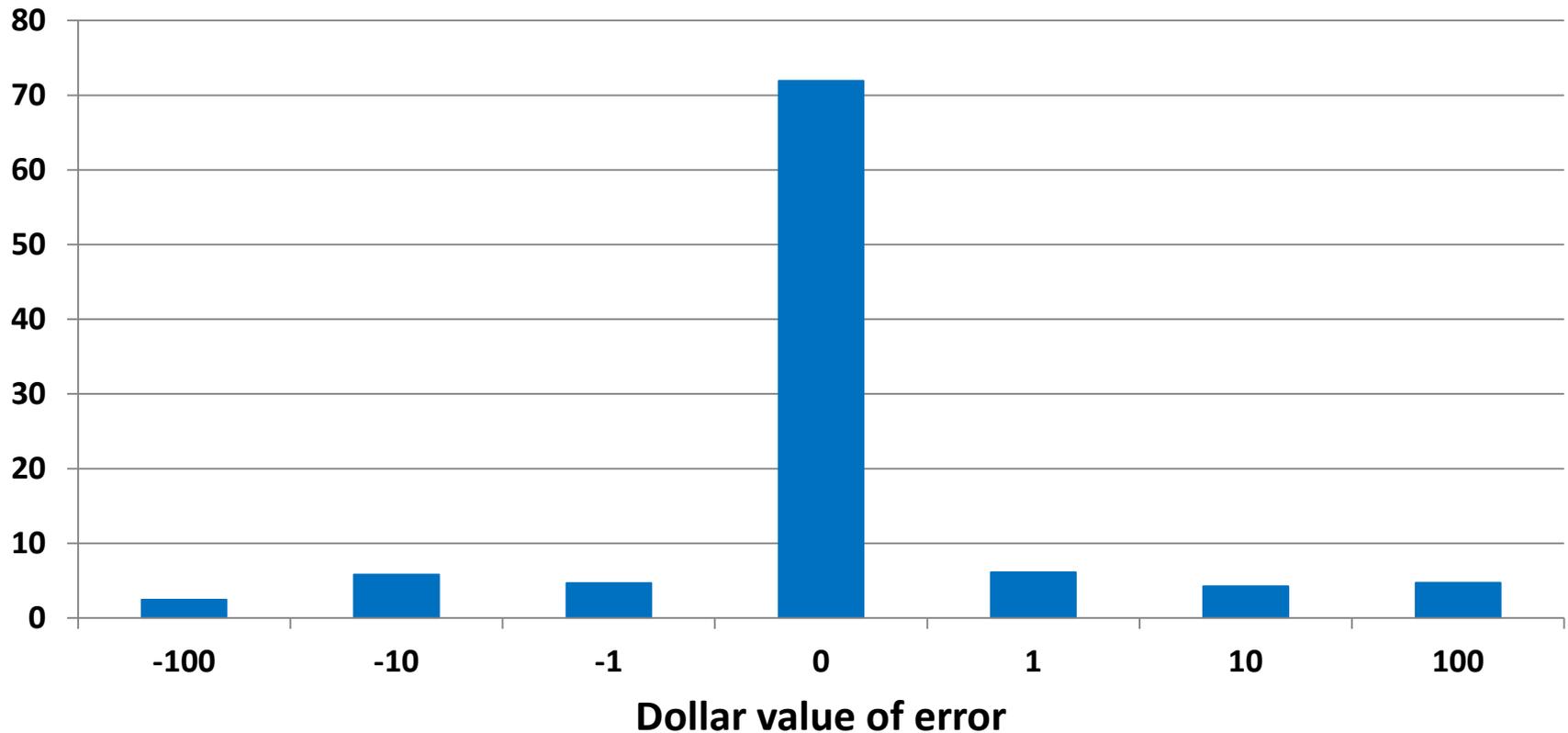
$$C_{d+1} = C_d + \sum_{j=1}^{N_d^W} W_{jd} - \sum_{j=1}^{N_d^D} D_{jd} \pm \epsilon$$

$d =$  day of month,  $j =$  one transaction

- DCPC gets better estimates of cash flow:
  - Diary recording instead of TTMS recall survey
  - Daily frequency
  - Measures every cash transaction
  - Real time error checking

Cash identity holds for 72.4% of diary days in 2012. How can we increase this rate?

2010 & 11 Percent Good Cash ID



# Improvements for 2015 DCPC

- **Assets:** Collected balances for other accounts
  - *Checking account, prepaid card, and PayPal.*
- **Income:** Collected dollar values and types
- **Consumption:**
  - *Improved separation of consumption and non-consumption*
  - *Increased bill payments estimates and details*
- **Payee:** improved identification to help understand payment choices
- **Questionnaires:** integrated the contents of the SCPC and DCPC

# Thank you

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