



Nonresponse Bias in the Telephone Point of Purchase Survey:

A summary of three studies

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All views expressed on this poster are those of the authors and do not necessarily reflect the views or policies of the U.S. Bureau of Labor Statistics.

I. Introduction

The Telephone Point of Purchase Survey (TPOPS) is a random digit dialed (RDD) computer-assisted-telephone-interview (CATI) survey that collects outlet and expenditure information from households. It serves as the main source for the outlet sampling frame for the U.S. Commodities and Services (C&S) Pricing Survey for the Consumer Price Index (CPI). It is a rotating panel survey with each consumer unit participating for four consecutive quarters.¹ The TPOPS is conducted by the Census Bureau for the Bureau of Labor Statistics (BLS). Since TPOPS' inception in the second quarter of 1997, the response rate has fallen from 68.2% to 47.1% in the last quarter of 2008.² Because of the decreasing response rate and because it is an Office of Management and Budget (OMB) requirement for clearance to conduct surveys, the BLS has embarked upon a non-response bias analysis of the TPOPS data.

One facet of the design of the TPOPS is that cell phone contacts are considered out-of-scope. The sample is drawn from banks of landline-only phone numbers. With the increase of cell-phone-only *households*, the BLS is assessing the potential bias associated with excluding cell-phone-only households and will take remedial action if a bias does indeed exist.

Cell-phone-only households have been the subject of several studies in the last several years. In 2004, the Current Population Survey (CPS) included questions in its supplement regarding the telephone service of households to measure how many were cell-phone-only. At that time, 6% of the households in the US used only cell-phones.³ In 2009, the National Health Statistics Reports revealed that in

¹ The BLS defines a consumer unit or CU as a person living alone or a group of two or more persons who are related by blood, marriage, or other living arrangement; or a group of two or more persons who share major living expenses.

² Response rate (see section 1) is calculated according to OMB's response rate definition:

$$\text{Unweighted Response Rate} = \frac{C}{C + R + NC + O + e(U)}$$

³ "Household Telephone Service and Usage Patterns in the United States in 2004: Implications for Telephone Samples," Clyde Tucker, J. Michael Brick, Brian Meekins, *Public Opinion Quarterly*, Vol. 71, No. 1, Spring 2007, pp. 3-22.

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2007, this number had almost tripled to 17.5%. Some states (Oklahoma and Utah) had rates over 25% of cell-phone-only households.⁴

This paper summarizes three studies that BLS conducted to assess if the TPOPS exhibits non-response bias.

The first study compares the demographics reported in TPOPS against the Census Bureau's American Community Service (ACS). The ACS is a mandatory survey with a response rate of 97%. There are significant differences in the demographics between the two surveys.

The second study compares TPOPS complete responders with attritors and intermittent respondents as proxies for non-respondents. This analysis shows significant demographic and expenditure differences between age-race cohorts in the TPOPS population.

In the final study, the expenditures reported in the Consumer Expenditure (CE) Interview are reviewed to see if there is a difference between cell-phone-only households and those households that would be considered in-scope for TPOPS: cell-phone and landline households and landline only households. The category in which each household falls depends on what type of phone bills they indicated they had in the reference period.

These studies suggest that data in the TPOPS are not missing completely at random (MCAR). There are age-race cohorts that are under-represented in the TPOPS population, whereas others are over-represented. To correct for these issues, the BLS is exploring different ways of collecting and representing the data.

In the short-term, the recommendation of adjusting weights to correct for the under-representation of some cohorts is worth pursuing. In the long-term, the

⁴ "Wireless Substitution: State-level Estimates From the National Health Interview Survey, January-December 2007", Stephen J. Blumberg, Ph.D.; Julian V. Luke, Gestur Davidson Ph.D.; Michael E. Davern, Ph.D; Tzy-Chyi Yu, M.H.A., Ph.D.; Karne Soderberg, M.S., National Health Statistics Reports, Number 14, March 11, 2009

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CPI will need to evaluate alternatives to the current land-line only RDD survey to provide its C&S Pricing sample frame.

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1. TPOPS Response Rates

TPOPS response rates show a decreasing trend since BLS switched to an RDD/CATI survey in 1997. The tables below show the response rate from the 1st quarter in 2005 to the 4th quarter in 2008. The tables show the response rate steadily decreasing. Response rates are calculated according to OMB’s response rate definition

Unweighted Response Rate

$$\text{Unweighted Response Rate} = \frac{C}{C + R + NC + O + e(U)}$$

- C = number of completed interviews or sufficient partially completed interviews
- R = number of refusals
- NC = number of noncontacted sample units known to be eligible
- O = number of eligible sample units not responding for reasons other than refusal
- U = number of sample units of unknown eligibility, not completed
- e = estimated proportion of sample units of unknown eligibility that are eligible, (set to 0.27)

Response Rate by Quarter⁵

Quarter	Interviews	Non Contacts	Refusals	Estimate of Unknown Population	Total	Response Rate
Q971	3453	429	1008	174.96	5,065.0	68.2%
Q972	6330	940	1736	357.21	9,363.2	67.6%
Q973	9217	978	2994	522.18	13,711.2	67.2%
Q974	12086	1266	3800	741.15	17,893.2	67.6%
Q981	11946	2026	3354	769.23	18,095.2	66.0%
Q982	12000	2419	3363	747.63	18,529.6	64.8%
Q983	11969	2690	3340	740.34	18,739.3	63.9%
Q984	11996	2312	3601	910.71	18,819.7	63.7%
Q991	11752	1496	3909	984.15	18,141.2	64.8%
Q992	11514	1284	4034	793.26	17,625.3	65.3%
Q993	10884	1907	3668	736.29	17,195.3	63.3%
Q994	11,502	1,667	4,019	738.18	17,926.2	64.2%
Q001	17,205	3,081	6,736	1,367.8	28,389.8	60.6%

⁵ Q042 experiences a rise in non-contacts due to the implementation of WEB-CATI software and the AAPOR classification method.

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Q002	16,666	4,004	6,455	1,302.5	28,427.5	58.6%
Q003	18,041	3,481	6,378	1,292.8	29,192.8	61.8%
Q004	17,904	2,320	6,094	1,299.5	27,617.5	64.8%
Q011	17,821	2,819	5,671	1,345.1	27,656.1	64.4%
Q012	13,680	2,357	4,731	963.4	21,731.4	63.0%
Q013	13,641	2,411	4,503	944.5	21,499.5	63.5%
Q014	13,824	2,290	4,424	935.6	21,473.6	64.4%
Q021	13,240	1,934	4,753	891.5	20,818.5	63.6%
Q022	13,166	2,559	5,144	996.6	21,865.6	60.2%
Q023	13,602	2,001	5,087	984.2	21,674.2	62.8%
Q024	13,684	2,178	5,136	955.0	21,953.0	62.3%
Q031	14,210	2,233	5,431	1,033.3	22,907.3	62.0%
Q032	14,084	2,920	5,019	1,015.7	23,038.7	61.1%
Q033	13,705	2,352	5,402	1,020.6	22,479.6	61.0%
Q034	13,759	2,132	5,618	1,076.0	22,585.0	60.9%
Q041	13,303	2,611	5,714	1,055.7	22,683.7	58.7%
Q042	11,297	5,042	5,363	1,557.9	23,259.9	48.6%
Q043	12,643	4,364	4,664	1,534.7	23,205.7	54.5%
Q044	13,999	4,160	5,097	1,200.2	24,456.2	57.2%
Q051	14,245	4,562	5,223	1,271.4	25,301.4	56.3%
Q052	15,021	4,822	5,934	1,274.7	27,051.7	55.5%
Q053	14,961	4,796	5,808	1,225.8	26,790.8	55.8%
Q054	14,851	5,978	6,732	1,254.2	28,815.2	51.5%
Q061	15,009	6,983	7,825	1,338.4	31,155.4	48.2%
Q062	15,121	6,649	7,414	1,498.2	30,682.2	49.3%
Q063	14,939	7,532	5,857	1,488.8	29,816.8	50.1%
Q064	15,197	5,391	7,391	1,237.7	29,216.7	52.0%
Q071	13,276	7,130	6,553	1,365.1	28,324.1	46.9%
Q072	13,869	8,006	7,102	1,576.0	30,553.0	45.4%
Q073	13,538	7,332	7,032	1,385.9	29,287.9	46.2%
Q073	13,264	6,881	6,457	1,216.4	27,818.4	47.7%
Q081	13,207	6,506	5,898	1,101.3	26,712.3	49.4%
Q082	9,996	7,315	4,742	1,252.0	23,305.0	42.9%
Q083	11,507	5,992	5,458	1,124.6	24,081.6	47.8%
Q084	12,687	6,125	6,877	1,276.8	26,965.8	47.1%

Breakdown of Response Rate

Quarter	% Interviews	%Non Contacts	% Refusals	% Estimate of Unknown Population		Non-Cont./ Ints.	Refs./Ints.
Q051	56.3%	18.0%	20.6%	5.0%		32.0%	36.7%
Q052	55.5%	17.8%	21.9%	4.7%		32.1%	39.5%
Q053	55.8%	17.9%	21.7%	4.6%		32.1%	38.8%
Q054	51.5%	20.8%	23.4%	4.3%		40.3%	45.3%
Q061	48.2%	22.4%	25.1%	4.3%		46.5%	52.1%
Q062	49.3%	21.7%	24.2%	4.9%		44.0%	49.0%
Q063	50.1%	25.3%	19.6%	5.0%		50.4%	39.2%
Q064	52.0%	18.5%	25.3%	4.2%		35.5%	48.6%
Q071	46.9%	25.2%	23.1%	4.8%		53.7%	49.4%
Q072	45.4%	26.2%	23.2%	5.2%		57.7%	51.2%
Q073	46.2%	25.0%	24.0%	4.7%		54.2%	52.0%
Q073	47.7%	24.7%	23.2%	4.4%		51.9%	48.7%
Q081	49.4%	24.4%	22.1%	4.1%		49.3%	44.7%
Q082	42.9%	31.4%	20.4%	5.4%		73.2%	47.4%
Q083	47.8%	24.9%	22.7%	4.7%		52.1%	47.4%
Q084	47.1%	22.7%	25.5%	4.7%		48.3%	54.2%

- The two response rates by quarter tables suggest that TPOPS has experienced an abrupt decline in response rate. The average annual response rate from 2005 to 2008 was 54.8%, 49.9%, 46.5%, and 46.8%, respectively.
- The cause of this decline can be attributed to a higher number of non-contacts and refusals. The combined average annual response rate of non-contacts and refusals from 2005 to 2008 was 40.5%, 45.5%, 48.7%, and 48.5%, respectively.

Response Rate by PSU

Area	Y2005	Y2006	Y2007	Y2008
East				
Boston	52.7%	47.3%	45.3%	45.5%
Philadelphia	50.2%	44.0%	47.3%	48.5%
Pittsburgh	60.6%	56.8%	52.4%	52.5%
New York	39.3%	34.1%	29.5%	30.0%
NY-CT Suburbs	46.9%	44.1%	43.4%	42.8%
NJ Suburbs	49.9%	44.3%	42.0%	43.7%
X-Sized East	59.2%	44.9%	58.7%	55.8%
Midwest				
Chicago	51.5%	48.2%	45.4%	45.5%
Detroit	57.9%	55.3%	50.3%	50.4%
St. Louis	65.1%	56.5%	56.0%	56.2%
Cleveland	61.4%	56.7%	51.3%	54.3%
Minneapolis	61.7%	59.9%	58.1%	58.9%
Milwaukee	60.1%	59.0%	54.5%	58.0%
Cincinnati	60.8%	55.5%	58.1%	57.0%
Kansas City	61.6%	60.2%	58.2%	61.3%
X-Sized Midwest	63.8%	49.8%	58.5%	58.4%
Y-Sized Midwest	68.6%	61.7%	64.1%	61.7%
South				
Washington	56.9%	51.3%	47.5%	49.0%
Baltimore	57.2%	55.3%	48.5%	48.1%
Dallas	55.3%	49.6%	44.1%	45.9%
Houston	50.2%	45.4%	42.9%	41.6%
Atlanta	44.7%	40.8%	40.2%	41.1%
Miami	37.7%	33.7%	29.9%	30.4%
Tampa	49.8%	45.9%	45.0%	46.7%
X-Sized South	55.5%	50.7%	47.5%	47.0%
Y-Sized South	59.2%	55.7%	50.2%	52.1%
West				
Los Angeles	44.6%	38.0%	35.8%	37.5%
LA Suburbs	53.3%	44.4%	40.0%	41.4%
San Francisco	50.6%	45.6%	42.9%	41.3%
Seattle	57.4%	53.2%	51.2%	50.3%
San Diego	52.8%	45.0%	41.7%	43.1%
Portland	62.6%	57.4%	56.1%	55.9%
Honolulu	46.3%	41.7%	41.7%	40.4%
Anchorage	61.4%	52.8%	51.4%	46.2%
Phoenix	55.1%	54.3%	48.4%	46.0%
Denver	59.0%	51.7%	52.2%	50.9%
X-Sized West	61.0%	48.7%	48.1%	51.4%
Y-Sized West	62.7%	62.2%	60.6%	58.2%

Response Rate by Region 2005-2008

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Region/Panel	Interviews	Non Contacts	Refusals	Estimate of Unknown Population	Total Cases	Response Rate
East - Panel 1	13,370	9,254	6,735	2,187.8	31,546.81	42.4%
East - Panel 2	11,818	6,885	4,992	902.9	24,597.88	48.0%
East - Panel 3	10,720	3,840	4,453	797.9	19,810.58	54.1%
East - Panel 4	9,322	3,205	3,675	700.9	16,902.92	55.2%
Midwest - Panel 1	14,830	7,029	4,535	1,527.4	27,921.39	53.1%
Midwest - Panel 2	12,796	5,125	3,170	582.1	21,673.12	59.0%
Midwest - Panel 3	11,114	2,810	2,684	494.9	17,102.91	65.0%
Midwest - Panel 4	9,379	2,205	2,162	433.9	14,179.89	66.1%
South - Panel 1	19,556	12,048	9,935	2,620.9	44,159.89	44.3%
South - Panel 2	16,735	8,698	7,111	1,008.2	33,552.18	49.9%
South - Panel 3	14,550	4,929	5,905	872.4	26,256.37	55.4%
South - Panel 4	12,298	3,937	4,726	714.2	21,675.15	56.7%
West - Panel 1	15,482	9,910	7,415	2,298.2	35,105.24	44.1%
West - Panel 2	13,620	7,433	5,575	923.7	27,551.67	49.4%
West - Panel 3	12,171	4,320	4,902	802.2	22,195.17	54.9%
West - Panel 4	10,632	3,688	4,111	700.9	19,131.92	55.6%

Response Rate by PSU Size/Panel

PSU - Size Panel	Interviews	Non Contacts	Refusals	*Estimate of Unknown Population	Total Cases	Response Rate
A - Panel 1	35,186	23,186	18,418	5,630.58	82,420.58	42.7%
A - Panel 2	31,363	17,484	13,831	2,287.17	64,965.17	48.3%
A - Panel 3	28,312	10,129	12,281	2,019.60	52,741.60	53.7%
A - Panel 4	24,864	8,554	10,230	1,776.60	45,424.60	54.7%
X - Panel 1	6,780	3,599	2,811	803.52	13,993.52	48.5%
X - Panel 2	5,820	2,937	2,021	292.41	11,070.41	52.6%
X - Panel 3	5,081	1,559	1,633	247.05	8,520.05	59.6%
X - Panel 4	4,255	1,294	1,283	208.98	7,040.98	60.4%
Y - Panel 1	3,689	2,124	1,479	426.06	7,718.06	47.8%
Y - Panel 2	3,465	1,860	1,179	184.68	6,688.68	51.8%
Y - Panel 3	3,293	1,070	1,063	170.91	5,596.91	58.8%
Y - Panel 4	3,025	986	952	157.14	5,120.14	59.1%

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- The response rate of the Midwest was clearly higher than the response rates of the other three regions for all four panels of interviews.
- The Midwest's A-sized (self-representing) PSUs also had higher response rates than other regions' PSUs and have not experienced the abrupt declines in response rate as have other PSUs. The Midwest's A-sized PSUs had an average response rate of 55.2%, while the East, the South, and the West had average response rates of 43.8%, 43.2%, and 45.3%, respectively. The average decline in response rate from 2005 to 2008 for the Midwest was 4.8%, while East, the South, and the West had average declines of 6.1%, 7.0%, and 9.0%.
- New York City (A109) had the lowest response rate in 2008, and was continually among the lowest responding PSUs from 2005 to 2008.
- The X-sized PSUs (metropolitan non-self-representing) and the Y-sized PSUs (nonmetropolitan non-self-representing) (53.2% and 57.4% respectively) had higher average response rates than A-sized PSUs.

2. Comparison of TPOPS Demographic Data to American Community Survey Data

A comparison of TPOPS socio-demographic data to the Census Bureau's American Community Survey's (ACS) socio-demographic data is necessary to analyze potential non-response bias in TPOPS.

TPOPS only collects demographic data from the respondent and not the other members of the consumer unit. This analysis assumes that the demographics of the TPOPS respondent represent the demographics of the entire consumer unit. The demographics of the consumer units are then compared against the demographic data of ACS householders. ACS reports the percentages of total householders that fall into various demographic groups, and these percentages are assumed to be the urban population's demographic percentages. These percentages are used to calculate the expected number of TPOPS consumer units, against which the observed number of TPOPS consumer units could be compared using Chi-Square tests.

Additional adjustments are made for respondents who did not answer demographic questions. The rate of non-response for race questions averages 16.6% between 2005 and 2008, and the rate of non-response for age questions averaged 14.6% between 2005 and 2008. The weight of non-response consumer units was reallocated, however, using the frequency distribution of those responding to race and age questions for each quarter and each population sampling unit (PSU). For example, if the weight of non-response equals 100 for a given PSU, and the distribution of those responding to race questions was 30% white, 30% black, 30% Hispanic, and 10% Asian, then the reallocated weight equals 30, 30, 30, and 10 for each group, respectively. After the weight of non-responders is reallocated, the quarterly distributions of each race and age group were averaged by year.

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2005

2005					
RACE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
American Indian and Alaska Native	0.6%	558,600	0.6%	587,531	1,498
Asian	4.5%	4,189,497	2.9%	2,732,643	506,606
Black or African American	13.6%	12,661,592	8.7%	8,100,797	1,642,830
Native Hawaiian and Other Pacific Islander	0.1%	93,100	0.3%	267,325	326,039
Two or more races	1.3%	1,210,299	1.7%	1,559,231	100,598
Some other race	5.1%	4,748,097	5.1%	4,758,278	22
White	74.8%	69,638,754	80.7%	75,094,133	427,365
Total		93,099,938		93,099,938	3,004,959

ORIGIN OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Hispanic or Latino origin	12.5%	11,637,492	10.0%	9,246,733	491,148
Other alone, not Hispanic or Latino	19.6%	18,247,588	14.9%	13,863,749	1,053,183
White alone, not Hispanic or Latino	67.9%	63,214,858	75.1%	69,696,719	664,630
Total		93,099,938		92,807,201	2,208,961

2006

2006					
RACE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
American Indian and Alaska Native	0.6%	637,721	0.7%	770,658	27,711
Asian	4.5%	4,782,910	1.7%	1,760,818	1,909,515
Black or African American	13.5%	14,348,729	16.7%	17,736,493	799,858
Native Hawaiian and Other Pacific Islander	0.1%	106,287	0.2%	247,575	187,817
Two or more races	1.4%	1,488,016	2.0%	2,169,588	312,187
Some other race	5.5%	5,845,778	3.9%	4,121,087	508,839
White	74.5%	79,183,726	74.8%	79,480,660	1,113
Total		106,286,880			106,286,880

ORIGIN OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Hispanic or Latino origin	12.8%	13,604,721	7.1%	7,536,609	2,706,559
Other alone, not Hispanic or Latino	19.6%	20,832,229	21.7%	23,069,314	240,231
White alone, not Hispanic or Latino	67.6%	71,849,931	71.2%	75,748,026	211,485
Total		106,286,880		106,353,949	3,158,275

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2007

2007					
RACE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
American Indian and Alaska Native	0.6%	576,854	0.8%	749,250	51,521
Asian	4.5%	4,326,408	2.3%	2,247,170	999,266
Black or African American	13.6%	13,075,366	7.4%	7,090,064	2,739,796
Native Hawaiian and Other Pacific Islander	0.1%	96,142	0.3%	272,899	324,964
Two or more races	1.4%	1,345,994	1.6%	1,573,829	38,566
Some other race	5.4%	5,191,690	4.5%	4,357,384	134,073
White	74.4%	71,529,945	83.1%	79,851,803	968,173
Total		96,142,399		96,142,399	5,256,358

2007					
ORIGIN OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Hispanic or Latino origin	13.0%	12,498,512	8.8%	8,461,975	1,303,645
Other alone, not Hispanic or Latino	19.7%	18,940,053	12.4%	11,784,461	2,703,397
White alone, not Hispanic or Latino	67.3%	64,703,834	78.8%	75,120,052	1,676,834
Total		192,284,797		192,284,797	5,683,877

Age Comparison

2005

2005					
AGE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Under 35 years	23.4%	21,712,993	16.4%	15,224,323	1,939,062
35 to 44 years	20.8%	19,300,438	19.9%	18,502,283	33,007
45 to 54 years	20.8%	19,300,438	22.9%	21,252,650	197,463
55 to 64 years	15.2%	14,104,166	18.4%	17,086,568	630,645
65 to 74 years	9.7%	9,000,685	12.7%	11,819,010	882,484
75 to 84 years	7.7%	7,144,874	7.7%	7,150,091	4
85 years and over	2.5%	2,319,764	1.9%	1,755,644	137,183
Total		92,790,568		92,790,568	3,819,847

2006

2006					
AGE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Under 35 years	22.1%	29,292,845	13.1%	17,335,664	4,880,856
35 to 44 years	20.8%	27,569,736	18.3%	24,236,423	403,013
45 to 54 years	21.2%	28,099,923	22.6%	30,003,476	128,951
55 to 64 years	15.9%	21,074,942	20.6%	27,264,141	1,817,617
65 to 74 years	9.8%	12,989,587	13.9%	18,433,391	2,281,443
75 to 84 years	7.6%	10,073,557	9.8%	12,931,239	810,671
85 years and over	2.7%	3,578,764	1.8%	2,342,474	427,079
Total		132,546,808		132,546,808	10,749,631

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2007

2007					
AGE OF HOUSEHOLDER	ACS Percentage	Expected Number of Consumer Units	TPOPS Percentage	Observed Number of Consumer Units	X^2
Under 35 years	21.8%	16,528,804	11.2%	8,463,854	3,935,155
35 to 44 years	20.4%	15,467,321	17.2%	13,072,395	370,825
45 to 54 years	21.3%	16,149,703	21.9%	16,607,394	12,971
55 to 64 years	16.3%	12,358,693	22.0%	16,686,084	1,515,234
65 to 74 years	9.9%	7,506,200	15.2%	11,535,562	2,162,980
75 to 84 years	7.5%	5,686,515	10.1%	7,670,160	691,961
85 years and over	2.7%	2,047,145	2.4%	1,784,752	33,632
Total		75,820,202		75,820,202	8,722,760

The differences between the TPOPS and ACS samples are statistically significant for race and age, for all years between 2005 and 2007. The differences in age of ACS householder percentages and TPOPS respondent percentages are particularly of interest in terms of TPOPS failing to collect enough from certain cohorts. The older age strata for TPOPS respondents represent a much larger percentage than the younger age strata when compared to ACS householders for all three years. From 2005 to 2007, the combined percentage of the two youngest strata fell from 36.4% to 28.4%. As with the TPOPS response rates for individual PSUs, the response rates may vary considerably among individual cohorts

In comparison to the age demographics, the TPOPS race demographics, while statistically significant, do not seem to be as problematic. The individual race cohorts fluctuate considerably between years, with some cohorts being closer to the ACS percentages in one year, then being considerably different in the next. The white cohort was always overrepresented, however, whereas other cohorts were underrepresented by as much as 6% to 7%. The black cohort was underrepresented by around 6% in 2005 and 2007, but was actually overrepresented by 3% in 2006. The Hispanic cohort was underrepresented by 3%, 5%, and 6% in the three years, respectively. The Asian cohort was underrepresented by between 2% to 3%. Other cohorts composing around 5%

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of TPOPS respondents were more in line with the percentages reported by ACS householders.

3. Comparison of Respondents Completing Four TPOPS Interviews and Dropout Respondents

In an attempt to analyze the characteristics of TPOPS non-responders, the expenditure means per TPOPS Category, or POPSCAT, and demographic data were compared for TPOPS respondents who completed four quarters of interviews (complete respondents) and respondents who dropped out of the survey after completing one or two interviews (attritors). The TPOPS attritors served as proxies for non-responders under the assumption that non-participation in TPOPS after one or two interviews indicates similarity to those who refuse to participate or are non-contacts. The time period of 2005 to 2008 was again used in this analysis; however, only respondents who had a chance to complete four interviews within that time period were included. Therefore, a respondent who completed his or her fourth interview in the first quarter of 2005 or began the survey in the second quarter of 2008 was not considered. Overall, there were 21,256 consumer units that completed four quarters of interviews and 22,446 attritor consumer units that completed one or two interviews.

The expenditure means of each POPSCAT were calculated for both the complete responders and the attritors and tested for significant differences using two-sample t-tests. There is a statistically significant difference in expenditure means for 33% of the POPSCATs, and the breakdown of significance by major groups is listed in the table below. The differences in expenditure mean are statistically insignificant for the majority of every major group's POPSCATs except for Apparel.

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Major Group	Number of Stat. Insig. POPSCAT means	Number of Stat. Sig. POPSCAT means
Apparel	7	16
Education/Communication	12	5
Food	36	25
General Items	10	6
Household Items	28	11
Medical	9	0
Recreation	26	6
Transportation	16	3

The large percentage of statistically insignificant differences in POPSCAT expenditure means hopefully suggest that there are not large differences in overall expenditure behavior between complete responders and attriters.

The demographic data for the always participating consumer units and the dropout consumer units was also calculated. Unfortunately, the dropout consumer units did not respond to demographic questions a considerable percentage of the time (Race – 16.4%, Age – 17.6%, Gender – 15.4%). In order to make a side-by-side comparison of the demographics of the always-participating consumer units and the dropout consumer units, the weight of the non-responding consumer units had to be redistributed to the demographic categories. The four year population mean was calculated for each PSU and the rates of non-response were calculated for each PSU and quarter. The final weights of consumer units responding to demographic questions were then adjusted to account for non-response and to equal the four-year population mean of each PSU.

Race Comparison

Completed 4 Interviews Q051 - Q081			Dropouts Q051 - Q081		
	# Consumer Units	Percent		# Consumer Units	Percent
White	75,391,466	85.5%	White	67,874,172	75.2%
Black	5,982,369	6.8%	Black	10,360,444	11.5%
Other	3,048,919	3.5%	Other	5,967,660	6.6%
Asian	1,953,697	2.2%	Asian	3,084,017	3.4%
Multi-race	1,163,421	1.3%	Multi-race	1,820,466	2.0%
American Indian	441,106	0.5%	American Indian	735,191	0.8%
Hawaiian/Pacific Islander	163,071	0.2%	Hawaiian/Pacific Islander	438,379	0.5%

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Completed 4 Interviews Q051 - Q081			Dropouts Q051 - Q081		
	# Consumer Units	Percent		# Consumer Units	Percent
Hispanic or Latino Origin	6,117,696	6.9%	Hispanic or Latino Origin	11,136,107	12.3%
Other, No Latino Origin	10,365,866	11.8%	Other, No Latino Origin	17,208,459	19.1%
White, No Latino Origin	71,660,487	81.3%	White, No Latino Origin	61,935,763	68.6%

Age Comparison

Completed 4 Interviews Q051 - Q081			Dropouts Q051 - Q081		
	# Consumer Units	Percent		# Consumer Units	Percent
UNDER 35	7,156,167	8.1%	UNDER 35	21,140,559	23.4%
BW 35-44	13,088,502	14.9%	BW 35-44	21,176,892	23.5%
BW 45-54	20,013,373	22.7%	BW 45-54	19,680,519	21.8%
BW 55-64	20,152,813	22.9%	BW 55-64	14,605,002	16.2%
BW 65-74	15,021,715	17.0%	BW 65-74	7,805,394	8.6%
BW 75-84	10,303,167	11.7%	BW 75-84	4,467,518	5.0%
OVER 85	2,408,314	2.7%	OVER 85	1,446,224	1.6%

Gender Comparison

Completed 4 Interviews Q051 - Q081			Completed 4 Interviews Q051 - Q081		
	# Consumer Units	Percent		# Consumer Units	Percent
Male	32,379,932	36.7%	Male	33,797,690	37.4%
Female	55,764,117	63.3%	Female	56,524,418	62.6%

The method of redistributing the final weight of non-responders precluded formal significance testing to determine if survey participation is independent of demographic characteristics. It still appears that there are considerable differences between the samples. The percentage of whites is much higher among those who completed the survey all four quarters, while the percentage of blacks and Hispanics is lower. The age demographics of the two groups appear particularly distorted. The older age ranges make up a large percentage of those who completed all four interviews, while the younger age ranges compose a large percentage of the dropout consumer units. While the demographic differences cannot be definitively confirmed, they do suggest that the consumer units completing four quarters of TPOPS interviews and those dropping out of the survey are different.

4. Comparison of Mean POPSCAT Expenditures for Cell Phone-Only and Landline Telephone Consumer Units in the Consumer Expenditure Survey

A sample of likely cell phone-only households was established using data from the Consumer Expenditure (CE) Interview Survey. A consumer unit was identified as a cell phone-only household if no expenditure for local telephone service was reported in any quarter of data 2006-2007. Overall, 23,250 CPI-Urban consumer units participated in the CE Interview Survey from 2006-2007, and the breakdown of households per telephone status is listed in the table below.

Group	Number of Consumer Units	Percent of Total
Landline and Cell Phone	11,324	48.7%
Landline Only	7,495	32.2%
Cell Phone Only	3,067	13.2%
No Telephone Expense	1,364	5.9%

Each consumer unit's expenditures were annualized and classified by TPOPS expenditure categories, or POPSCAT. The expenditure mean of each POPSCAT was calculated for each of the groups above, and the expenditure means were compared using a two-sample t-test. Overall, the most important analysis is the comparison between cell phone-only consumer units and the consumer units that would compose the TPOPS sample - consumer units with both landline and cell phone expenses and consumer units with landline expenses only.

It should be noted that certain POPSCATs, especially from the Food major group, were not included in the analysis because they are only reported in the Consumer Expenditure Survey's Diary survey. The Diary survey asks a consumer unit to report its expenditures during a two week period every quarter. It is difficult to determine if a consumer unit is cell phone-only given that it may not have received a cellular telephone bill during that two week survey period. In

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contrast, the CE Interview Survey has a three month recall period that covers an entire quarter, meaning no expenditure will be excluded due to a time gap in a consumer unit's participation in the survey.

Expenditure means were compared for 140 POPSCATs using the two-sample t-test.⁶ Using a level of significance, $\alpha = 0.025$, 94 POPSCATs, or 67.1% of all POPSCATs, had statistically significant differences in mean expenditures. The breakdown of statistical significance by POPSCAT major group is as follows:

Major Group	Number of Stat. Insig. POPSCATS	Number of Statistically Sig. POPSCATS
Apparel	12	11
Education/Communication	4	9
Food	0	1
General Items	6	8
Household Items	9	28
Recreation	9	22
Transportation	8	12

In addition to the comparison of expenditure means, analysis of the demographics of the cell phone-only sample and the TPOPS-eligible sample also implies that there are considerable differences between the two groups. The difference in age demographics seems most striking, and Chi-square tests for independence also showed that differences in gender, race, and salary were statistically significant.

⁶ A Shapiro-Wilk statistic was calculated to determine the normality of the samples of expenditures by POPSCAT for each group. Only one sample (New Cars and Trucks for the cell phone-only population) failed to pass the normality test assuming $\alpha = 0.05$.

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Age Span	Landline+Cell/Landline Only	Cell Phone-Only
UNDER 35	18.0%	61.2%
BW 35-44	21.2%	17.1%
BW 45-54	21.9%	12.5%
BW 55-64	17.3%	7.02%
BW 65-74	10.8%	1.8%
BW 75-84	8.1%	0.3%
OVER 85	2.7%	0.1%

The null hypothesis that cell phone status is independent of age was rejected by a Chi-square test of independence. ($\chi^2 = 2740.53$, $df = 6$, $p\text{-value} = <.0001$).

Gender	Landline+Cell/Landline Only	Cell Phone-Only
Male	44.9%	52.9%
Female	55.1%	47.1%

The null hypothesis that cell phone status is independent of gender was rejected by a Chi-square test of independence. ($\chi^2 = 63.46$, $df = 1$, $p\text{-value} = <.0001$).

Race	Landline+Cell/Landline Only	Cell Phone-Only
White	81.1%	79.8%
Black	12.4%	12.8%
Asian	4.5%	4.9%
Hawaiian/Pac. Islander	1.2%	1.4%
Amer. Indian	0.5%	0.7%
Multiple Race	0.4%	0.4%

The null hypothesis that cell phone status is independent of race was not rejected by a Chi-square test of independence. ($\chi^2 = 5.344$, $df = 5$, $p\text{-value} = .3753$).

	Landline+Cell/Landline Only	Cell Phone-Only
Hispanic or Latino Origin	12.7%	18.0%
Other Only, No Hispanic Origin	18.4%	19.7%
White Only, No Hispanic Origin	68.9%	62.3%

The null hypothesis that cell phone status is independent of Hispanic origin was rejected by a Chi-square test of independence. ($\chi^2 = 71.96$, $df = 2$, $p\text{-value} = <.0001$).

Salary	Landline+Cell/Landline Only	Cell Phone-Only
<\$10,000	21.3%	23.0%
\$10,000 - \$30,000	21.5%	29.2%
\$30,000 - \$50,000	17.1%	22.8%

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\$50,000 - \$70,000	12.5%	11.0%
\$70,000 - \$90,000	9.1%	6.8%
\$90,000 - \$125,000	9.1%	4.5%
\$125,000 - \$200,000	8.1%	2.4%
>\$250,000	1.4%	0.3%

The null hypothesis that cell phone status is independent of salary was rejected by a Chi-square test of independence. ($\chi^2 = 333.65$, $df = 7$, $p\text{-value} = <.0001$).

The statistically significant differences in overall expenditure and demographics suggest that the cell phone-only and TPOPS-eligible populations are not very similar. For TPOPS, however, the main concern is whether cell phone-only consumer units purchase goods and services at outlets, where price change behavior is different and the subsequent effect on the CPI is different. The CE Interview Survey does not collect data on outlets, and drawing conclusions from analysis of the expenditure means of individual POPSCATs or major groups is difficult.

A comparison of the major groups with the highest and lowest percentage of statistically significant POPSCAT expenditure means underlies the difficulty in drawing definite conclusions. The Housing major group had the largest percentage of POPSCATs with statistically significant expenditure means. The Housing major group includes a wide range of POPSCATs from lodging away from home to household appliances and services. After classifying the POPSCATs into several categories, it becomes more certain that there are general differences between the expenditure behaviors of the two samples. For instance, all of the POPSCATs for household services, household decorations, and furniture are statistically significant.

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	Significant	Insignificant
Household Services	Fuel Oil, Cooking Fuel, Water/Sewer Service, Garbage Collection, Home Repair, Housekeeping Services, Lawn/Garden Services, Major Appliance Repair, Reupholstery	
Household Decorations	Floor Coverings, Window Coverings, Linens, Sofas, Mattresses, Lamps/Clocks	
Furniture	Living Room Chairs/Tables, Kitchen/Dining Room Furniture, Infants' Furniture, Outdoor Furniture, Bookcases/Desks	
Major Appliances	Refrigerators/Freezers, Stoves/Ovens/Microwaves	Washers/Dryers
Small Appliances	Vacuums, Small Kitchen Appliances, Heating Equipment	Power Tools, Non-powered Tools
Miscellaneous	Lodging away from Home, Indoor Plants, Dishes, Lawn/Garden Equipment	Lawn/Garden Supplies/Insecticides, Moving/Freight Services, Paint, Kitchen Utensils/Cooking Ware

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In contrast to the Housing major group, the Apparel major group had the lowest percentage of statistically insignificant differences in mean expenditure. It appears that, similar to the Housing major group, there is a general difference in expenditure behavior between the cell-phone-only and TPOPS-eligible populations.

	Significant	Insignificant
Men's Apparel	Men's Shirts	Men's Coats/Jackets, Men's Sportswear, Men's Footwear, Men's Pants, Men's Ties/Belts/Wallets, Men's Underwear/Sleepwear, Men's Suits
Women's Apparel	Women's Sportswear, Women's Footwear, Women's Tops/Skirts/Pants, Women's Underwear/Nightwear, Women's Outerwear	Women's Hoisery, Women's Dresses, Women's Suits,
Children's/Infants' Apparel	Boy's/Girl's Footwear, Boy's Clothing, Girl's Clothing, Infants' Clothing,	Infants' Underwear/Diapers,
Miscellaneous	Watches	Jewelry

Overall, the characteristics of the cell-phone-only population are considerably different from the characteristics of the TPOPS-eligible population. In comparison to the TPOPS-eligible population, the cell phone-only population is more racially diverse, younger, less wealthy, and more likely to be male. The cell phone-only population's expenditure behavior seems considerably different from the TPOPS-eligible population's expenditure behavior, because 67% of the POPSCATs have statistically significant differences in expenditure means.

5. Summary and recommendations

The TPOPS is used as the main source for the outlets in the CPI's C&S Pricing Survey. Because there is no comparable source against which to compare the CPI's outlet frame, the demographics and expenditures of TPOPS respondents are used as proxies and compared against similar data from the American Community Survey and the Consumer Expenditure Quarterly Interview Survey.

In the first study, we compared the demographics of the TPOPS' respondents to the demographics reported in the ACS. This comparison showed that the differences between the age cohorts in ACS and TPOPS are significantly different. TPOPS over-represents older cohorts and under-represents younger cohorts. The design of TPOPS excludes cell-phone numbers from its sample, which may explain this under-representation of the younger population. This study also shows that there are statistically significant differences in the race of TPOPS respondents compared to ACS households, although the differences were less pronounced than the age differences.

The next study compared expenditures and demographics of complete and dropout respondents from the TPOPS. Around 33% of the POPS categories that were surveyed are significantly different between these two groups of respondents. Because of high item non-response, the demographic comparisons are less conclusive.

The final study focuses solely on data from the Consumer Expenditure Quarterly Interview Survey. The differences in the POPSCAT expenditures means between cell-phone-only consumer units and land-line-only and land-line/cell-phone consumer units were statistically significant for 94 out of the 140 POPS categories compared. The differences between these two populations' expenditures may indicate that the two populations obtain goods and services from different sources.

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These studies show that expenditure and demographic data in the TPOPS are likely not missing completely at random (MCAR). There are age-race cohorts that are under-represented in the TPOPS population, whereas others are over-represented. Because expenditures and demographics are proxies for the outlets reported, it is unclear if the outlets reported in the TPOPS indicate a non-response bias. These studies do indicate a need for further analysis. To address the issues raised in this research, the BLS is exploring different ways of collecting and representing the data.

In the short-term, the recommendation of adjusting population weights to correct for the under-representation of some cohorts needs further research. In the long-term, the CPI will need to evaluate alternatives to the current design of the land-line only RDD TPOPS survey to provide its C&S Pricing sample frame.

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Appendix A - Comparison of POPSCAT Expenditure Means of Respondents Completing Four TPOPS Interviews and Dropout Respondents⁷

POPSCAT	POPSCAT Title	T Statistic	Completed Consumer Unit Expenditure Reports	Completed Consumer Unit Expenditure Mean	Attritor Consumer Unit Expenditure Reports	Attritor Consumer Unit Mean Expenditure
T17	Ship Travel or Passenger Cruises	3.26	708	\$5,599.94	172	\$4,119.91
H22	Heating or Cooling Equipment or Home Safety Devices	2.43	866	\$763.64	300	\$543.68
H16	Occasional Furniture such as Bookcases, Desks, or Ottomans	2.13	701	\$412.40	260	\$325.12
H20	Vacuums or Other Electric Floor Cleaning Equipment	2.07	1,078	\$231.11	397	\$197.51
E17	Local or Long Distance Landline Telephone Service including Prepaid Phone Cards	2.03	369	\$52.47	21	\$41.76
H40	Inside Home Maintenance or Repair	1.99	1,791	\$5,990.30	497	\$4,548.37
H04	Other Household Fuels For Heating or Cooking such as Propane, Firewood, or Coal	1.96	905	\$466.27	273	\$376.80
H03	Fuel Oil	1.69	607	\$1,581.04	234	\$1,428.83
H26	Indoor Plants or Fresh Cut Flowers	1.58	2,006	\$81.22	648	\$70.27
E06	Day Care Providers including Nursery Schools	1.56	372	\$4,236.65	185	\$3,662.54
M01	Prescription Drugs	1.54	2,585	\$76.43	643	\$68.60
R09	Pets, Pet Supplies or Accessories	1.46	780	\$55.18	276	\$44.17
F34	Roasted, Instant, or Freeze Dried Coffee	1.39	1,812	\$10.14	482	\$9.33
H19	Stoves, Ovens or Microwave Ovens	1.39	686	\$729.60	262	\$454.93
H18	Washers or Dryers	1.36	527	\$826.04	230	\$760.93
F57	Wine for Home Use	1.34	2,149	\$156.11	598	\$131.17
F39	Butter or Margarine	1.24	1,648	\$4.33	468	\$4.09
R01	Televisions	1.05	1,073	\$979.83	369	\$908.12
F54	Catered Events or Board	0.98	151	\$2,473.32	43	\$1,781.58
T12	Motor Vehicle Repair	0.88	2,288	\$1,433.51	666	\$1,206.50

⁷ Sorted by T-Statistic, 90% Significance Level used

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T05	Gasoline, Diesel, or Alternative Fuels	0.88	4,259	\$94.47	1,479	\$64.86
R30	Newspaper or Magazine Subscriptions	0.86	1,735	\$159.49	468	\$143.59
H15	Outdoor Furniture	0.82	791	\$419.62	247	\$382.30
R13	Unpowered Boats or Trailers	0.80	280	\$4,931.54	68	\$3,948.82
M08	Hospital Services	0.79	1,507	\$2,655.78	544	\$2,182.50
H05	Residential Water or Sewer Service	0.77	2,610	\$685.46	842	\$617.98
A05	Men's Active Sportswear such as Exercise Apparel or Bathing Suits	0.72	1,784	\$380.47	679	\$258.28
R10	Pet Services	0.70	1,007	\$207.01	321	\$194.88
G15	Checking Accounts, Credit Card Fees, or Other Bank Services	0.64	1,085	\$107.79	399	\$90.72
G01	Cigarettes	0.60	779	\$43.20	335	\$41.69
E13	Online or Other Information Services	0.59	2,453	\$216.90	776	\$204.78
R25	Club Membership Dues such as Recreational Clubs, Fraternal or Civic Organizations, or Fees Paid for Participant Sports	0.55	1,662	\$707.56	440	\$670.12
H38	Major Appliance Repair	0.49	1,170	\$648.00	353	\$567.12
R18	Cameras or Other Photographic Equipment excluding Film	0.33	1,888	\$427.30	571	\$419.18
R07	Prerecorded or Blank Audio Tapes, CDs or Records	0.32	923	\$61.15	291	\$59.26
F40	Salad Dressing or Mayonnaise	0.30	1,917	\$5.42	558	\$5.27
M05	Dental Services	0.29	2,902	\$925.40	783	\$906.11
H29	Non-powered Tools, or Miscellaneous Hardware	0.26	1,720	\$194.80	520	\$189.04
E15	Calculators, Typewriters, or Other Information Processing Equipment	0.25	565	\$67.06	222	\$65.08
T19	Taxi Fare	0.24	397	\$99.57	143	\$96.45
R27	Admissions to Sporting Events	0.22	1,164	\$459.07	444	\$445.34
M02	Internal or Respiratory Over-The-Counter Drugs	0.18	596	\$20.78	196	\$20.42
F52	Meals or Snacks at Schools or Employer Provided Cafeterias, Dining Rooms or Snacks Bars	0.17	938	\$29.63	301	\$29.29
F26	Lettuce	0.17	1,607	\$3.87	458	\$3.83
T03	Leased Cars, Trucks, or Vans	0.15	301	\$19,983.00	90	\$19,654.96
F06	Cakes or Cupcakes (excluding Frozen)	0.07	1,108	\$19.92	430	\$19.71

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H17	Refrigerators or Home Freezers	0.06	573	\$964.28	210	\$958.14
E07	Tuition or Fixed Fees for Technical or Vocational Schools	0.05	347	\$10,665.92	137	\$10,531.58
H39	Reupholstery of Household Furniture	0.04	301	\$1,273.60	72	\$1,255.25
G10	Funeral Services	0.00	732	\$5,618.07	180	\$5,618.08
T20	Car or Van Pools	-0.10	44	\$175.91	25	\$184.64
H23	Household Decorative Items Including Clocks or Lamps	-0.10	1,531	\$300.02	594	\$303.22
F56	Distilled Spirits for Home Use	-0.12	1,269	\$130.34	385	\$131.53
F10	Uncooked Beef or Veal including Frozen	-0.13	2,610	\$31.09	790	\$31.34
F42	Soups	-0.13	2,079	\$10.06	696	\$10.12
T01	New Cars, Trucks, or Vans	-0.15	2,152	\$31,630.68	596	\$31,800.46
R11	Veterinarian Services	-0.20	1,701	\$399.48	503	\$409.13
R14	Bicycles or Bicycling Accessories	-0.20	1,155	\$321.40	410	\$327.97
M09	Adult Day Care	-0.22	16	\$3,331.88	14	\$3,652.64
M04	Physician's Services	-0.31	3,175	\$1,024.32	926	\$1,086.18
G02	Tobacco Products Other Than Cigarettes	-0.34	197	\$44.79	75	\$47.56
F18	Cheese or Cheese Products	-0.34	2,204	\$7.66	612	\$7.78
R31	Books Purchased Through Book Clubs	-0.37	503	\$159.01	173	\$168.46
T14	Local Vehicle Registration	-0.38	886	\$169.76	336	\$175.08
F47	Baby Food	-0.40	190	\$32.81	85	\$34.95
F50	Full Service Meals or Snacks	-0.42	2,462	\$81.74	698	\$83.65
A22	Watches	-0.43	1,426	\$206.62	538	\$226.02
A23	Jewelry	-0.49	1,319	\$640.08	426	\$725.69
F37	Candy or Chewing Gum	-0.50	1,462	\$8.96	476	\$9.33
R04	Blank or Pre-recorded Video Cassettes and Video Discs	-0.52	859	\$57.59	277	\$60.32
G16	Tax Return Preparation or Other Accounting Services	-0.53	2,174	\$356.16	700	\$416.58
R29	Single Copy Newspapers or Magazines	-0.55	1,408	\$7.93	548	\$8.25
R26	Admissions such as Movies, Concerts, or Theme Parks	-0.58	1,900	\$95.00	679	\$100.00
F28	Other Fresh Vegetables including Fresh Herbs	-0.62	1,638	\$15.63	446	\$16.70
H13	Kitchen or Dining Room Furniture	-0.65	1,020	\$1,317.52	372	\$1,435.41

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H10	Bedroom Furniture Including Mattresses and Springs	-0.66	1,212	\$1,304.79	480	\$1,361.80
H36	Gardening or Lawn Care Services	-0.67	1,486	\$1,583.30	393	\$1,712.14
G14	Watch or Jewelry Repair	-0.67	1,233	\$79.94	357	\$88.85
R23	Sewing Machines, Fabric or Sewing Supplies	-0.69	1,300	\$208.21	375	\$226.56
H35	Housekeeping Services	-0.72	751	\$2,408.42	190	\$2,639.67
F08	Crackers or Other Bread Products	-0.73	1,780	\$5.86	551	\$6.12
F48	Prepared Salads or Salad Bars, excluding Restaurants	-0.73	937	\$9.36	272	\$9.85
T04	Car, Truck, or Van Rental	-0.73	1,305	\$757.51	299	\$816.58
R24	Musical Instruments or Musical Accessories	-0.73	1,006	\$1,018.13	307	\$1,167.60
F44	Chips, Nuts, or Other Snacks excluding Candy	-0.75	1,698	\$14.29	571	\$14.88
F15	Processed Fish or Seafood, including Frozen, Canned or Cooked	-0.77	1,799	\$15.04	488	\$15.85
A12	Women's Suits or Suit Components	-0.78	664	\$356.96	244	\$390.76
E05	Tuition or Fixed Fees for Private Elementary or High Schools	-0.81	348	\$4,598.74	139	\$5,432.47
T02	New Motorcycles	-0.82	145	\$11,626.83	52	\$13,336.54
E04	Tuition or Fixed Fees for a College or University	-0.83	818	\$9,761.43	237	\$10,955.24
F16	Eggs or Egg Substitutes	-0.83	2,535	\$3.34	717	\$3.51
M07	Services by Other Medical Professionals	-0.87	830	\$655.40	223	\$1,341.16
E03	Encyclopedias or Other Sets of Reference Books	-0.88	243	\$158.40	79	\$189.75
F49	Easy-To-Prepare Canned or Packaged Foods excluding Fruits, Vegetables or Soups	-0.90	1,215	\$21.42	367	\$23.04
T11	Motor Vehicle Maintenance, Inspections, or Towing	-0.93	3,002	\$293.30	834	\$309.43
F25	Potatoes	-0.96	1,477	\$4.52	441	\$4.77
G13	Clothing Rental, Alterations or Repairs	-0.96	1,169	\$123.01	383	\$136.24
H08	Window Coverings such as Curtains, Drapes or Blinds	-0.99	2,444	\$656.66	900	\$728.76
R19	Photographer's Fees	-0.99	779	\$468.72	221	\$547.48
H07	Floor Coverings such as Hard Surface Tiling, Carpets or Scatter Rugs	-0.99	1,354	\$2,227.78	422	\$2,558.91
R32	Books Not Purchased Through Book Clubs	-1.01	1,383	\$123.09	429	\$945.08
T10	Motor Vehicle Body Work	-1.04	906	\$1,145.34	283	\$1,296.37

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R12	Outboard Motors or Powered Sports Vehicles	-1.06	303	\$10,226.43	102	\$12,908.90
R28	Recreational Lessons or Instruction	-1.09	730	\$581.20	202	\$666.83
F29	Canned Fruits or Vegetables	-1.13	1,441	\$27.75	467	\$30.28
F07	Cookies	-1.16	2,011	\$7.40	654	\$10.96
R08	Pet Food	-1.17	2,577	\$37.30	888	\$39.35
M06	Eyeglasses or Eye Care	-1.18	2,469	\$379.05	722	\$407.79
F55	Beer, Ale, or Other Malt Beverages for Home Use	-1.19	1,123	\$28.54	382	\$31.73
H30	Powered Lawn or Garden Equipment or Other Outdoor Items	-1.20	1,389	\$581.78	488	\$681.28
T15	Parking Fees or Tolls	-1.21	1,381	\$40.49	451	\$46.96
G12	Shoe Repair or Other Shoe Services	-1.22	647	\$55.26	177	\$118.22
T13		-1.26	1,516	\$1,458.98	603	\$1,567.91
H06	Garbage or Trash Collection Service	-1.27	1,867	\$256.27	567	\$271.35
F27	Tomatoes	-1.27	1,336	\$4.29	386	\$4.71
R20	Film Development	-1.28	1,836	\$41.71	565	\$46.07
H02	Lodging Away From Home such as Hotels, Motels, or Vacation Rentals	-1.30	2,374	\$1,049.04	793	\$1,172.17
T08	Vehicle Parts or Accessories	-1.33	1,338	\$298.18	478	\$366.88
E12	Computer Software or Accessories	-1.34	1,270	\$175.49	410	\$208.35
M03	Medical Equipment, Supplies, Topicals or Dressings	-1.35	1,278	\$55.55	414	\$82.64
E01	College or University Level Textbooks	-1.40	876	\$712.61	254	\$950.05
F45	Seasonings, Spices, or Miscellaneous Baking Products such as Salt, Coat 'n Bake Products, Yeast, or Baking Chocolate	-1.43	1,018	\$22.05	308	\$25.87
T07	Tires	-1.43	1,803	\$426.92	635	\$452.89
F36	Sugar or Artificial Sweeteners	-1.45	1,641	\$5.58	627	\$6.09
H37	Moving, Storage, or Freight Services	-1.47	918	\$1,599.32	352	\$2,078.83
T16	Automobile Service Clubs	-1.51	1,637	\$101.36	394	\$122.64
F32	Carbonated Drinks	-1.52	1,509	\$12.62	511	\$13.92
H25	Non-Electric Kitchen Utensils, Cookingware or Bakeware	-1.55	1,204	\$74.72	379	\$87.04
R16	Hunting, Fishing, or Camping Equipment	-1.56	656	\$284.69	213	\$370.79
H11	Sofas, Slipcovers, or Decorative Pillows	-1.57	2,148	\$1,319.65	792	\$1,489.23
A21	Infants' or Toddlers' Underwear or Diapers	-1.57	418	\$40.76	208	\$55.50

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F20	Miscellaneous Dairy Products including Yogurt, Powdered Milk, or Coffee Creamers	-1.58	1,741	\$6.59	455	\$7.38
H14	Infants' Furniture	-1.59	387	\$473.21	175	\$654.86
R17	Film or Film Development Supplies	-1.60	992	\$29.25	307	\$33.78
A09	Women's Outerwear	-1.62	1,854	\$263.84	700	\$305.62
F51	Limited Service Meals or Snacks	-1.63	2,785	\$41.08	906	\$47.91
E02	Elementary or High School Textbooks	-1.64	286	\$206.43	99	\$292.92
G19	Luggage, Briefcases, or Other Carrying Cases	-1.65	1,487	\$190.17	436	\$290.69
H31	Lawn or Garden Supplies or Insecticides	-1.74	2,611	\$153.90	697	\$191.23
F17	Milk	-1.74	3,380	\$6.64	965	\$7.24
E08	Delivery Services	-1.74	1,095	\$86.79	346	\$127.30
F24	Other Fresh Fruits	-1.75	1,321	\$9.66	351	\$11.08
G09	Legal Services	-1.77	765	\$2,780.53	225	\$5,261.30
E14	Home or Cellular Telephones, Answering Machines, or Other Phone Accessories	-1.79	1,778	\$281.05	647	\$503.45
F35	Powdered Drinks, Tea, Cocktail Mixes or Ice	-1.79	1,362	\$8.69	409	\$10.25
R06	Auto or Home Audio Equipment	-1.88	764	\$319.40	251	\$385.17
A10	Women's Dresses	-1.90	959	\$204.51	329	\$247.31
H12	Living Room Chairs or Living Room Tables	-1.90	1,269	\$1,042.96	472	\$1,223.59
F33	Non-Carbonated Juices or Drinks, Frozen or non-Frozen	-1.95	1,550	\$11.48	443	\$12.82
R03	VCRs, Camcorders, or Other Video Equipment	-1.96	1,095	\$277.48	375	\$385.91
F21	Apples	-1.99	1,390	\$5.95	401	\$6.84
F19	Ice Cream, Frozen Yogurt, or Flavored Ices	-2.00	1,732	\$7.46	478	\$8.46
F38	Jellies, Syrups, Honey, Molasses, Marshmallows, Icings, or Fudge Mixes	-2.01	1,490	\$7.48	457	\$8.59
A02	Men's Coats or Jackets	-2.06	1,085	\$151.79	323	\$180.86
F53	Food or Beverages from Vending Machines or Mobile Vendors	-2.07	764	\$7.79	292	\$9.46
T09	Motor Oil, Coolants, or Fluids	-2.13	1,578	\$47.97	560	\$55.12
A11	Women's Tops, Skirts, Pants, or Shorts	-2.14	1,765	\$301.98	554	\$361.41
F04	Bread	-2.17	4,457	\$6.23	1,475	\$6.66
H34	Other Disposable Products such as Plastic or Foil Wraps, Garbage Bags, Paper Plates, Batteries, or Light bulbs	-2.24	1,478	\$23.87	526	\$27.36

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A03	Men's Socks, Underwear, Sleepwear or Bathrobes	-2.36	2,280	\$58.12	844	\$66.04
A19	Women's Footwear	-2.37	1,419	\$131.69	435	\$155.70
F41	Peanut Butter, or Cooking Fats and Oils	-2.39	1,205	\$6.51	363	\$7.69
R22	Video Game Hardware, Cartridges, Disks or Accessories	-2.47	1,133	\$202.66	434	\$248.20
F01	Flour or Prepared Flour Mixes	-2.53	1,591	\$7.79	449	\$11.40
H24	Dishes, Glassware, or Flatware	-2.54	1,576	\$146.16	631	\$184.03
R15	General Sports Equipment	-2.54	913	\$246.82	301	\$332.32
T18	Intracity Mass Transit	-2.59	457	\$58.47	167	\$77.00
G08	Haircuts or Other Personal Care Services	-2.61	2,524	\$56.52	779	\$67.74
H33	Paper Napkins, Paper Towels, Facial Tissue or Toilet Paper	-2.65	1,994	\$25.82	688	\$29.14
F30	Frozen Fruits or Vegetables	-2.67	2,305	\$23.48	730	\$26.96
A06	Men's Shirts, Sweaters, or Vests	-2.67	1,365	\$174.95	419	\$217.59
A17	Men's Footwear	-2.68	1,137	\$114.84	356	\$137.22
F58	Alcoholic Beverages Away From Home	-2.70	1,131	\$39.76	378	\$51.25
F09	Other Bakery Products including Frozen	-2.72	907	\$8.54	267	\$11.85
R21	Toys, Games, Hobbies, or Playground Equipment	-2.74	1,373	\$264.70	456	\$372.70
A01	Men's Suits or Blazers	-2.76	758	\$458.71	226	\$613.33
H28	Power Tools	-2.79	1,671	\$466.60	497	\$603.35
F46	Condiments, Sauces, or Gravies, such as Catsup, Mustard, Relishes, Tomato Sauces or Gravy Mixes	-2.81	1,384	\$17.10	459	\$20.81
H21	Small Electric Kitchen Appliances	-2.85	1,534	\$73.30	508	\$92.36
F22	Bananas	-2.87	1,770	\$3.49	476	\$4.33
G18	Stationery, School Supplies, or Giftwrap	-2.88	1,090	\$45.04	415	\$61.22
R05	Rental of Video Tapes or Video Discs	-2.90	1,439	\$19.24	525	\$23.68
E10	Long Distance Telephone Services	-2.94	1,630	\$26.33	548	\$31.38
A13	Women's Underwear or Nightwear	-3.03	1,989	\$72.77	695	\$87.46
H27	Paint, Wallpaper Tools, or Related Supplies	-3.07	1,725	\$221.34	563	\$314.63
F23	Fresh Citrus Fruits	-3.14	963	\$6.15	301	\$7.91
A04	Men's Accessories such as Ties, Belts, or Wallets	-3.21	1,572	\$129.73	581	\$187.94
F12	Lunchmeats, Hotdogs or Other Meats	-3.30	2,527	\$12.26	755	\$14.41

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A07	Men's Pants, Jeans or Shorts	-3.34	1,332	\$131.73	416	\$178.07
G07	Cosmetics, Perfumes, or Bath and Nail Preparations	-3.37	2,198	\$53.90	745	\$64.77
F57	Deodorant, Feminine Hygiene Products, Suntan Lotions, or Footcare Products	-3.43	1,594	\$31.15	586	\$40.16
F14	Fresh Fish or Seafood	-3.44	1,318	\$29.13	405	\$37.06
E11	Personal Computers or Peripheral Equipment	-3.46	2,004	\$1,305.50	675	\$1,525.09
A14	Women's Hosiery or Accessories	-3.51	2,051	\$87.50	773	\$119.25
F43	Frozen Prepared Foods	-3.52	2,126	\$25.25	666	\$29.86
F11	Pork, Ham, or Breakfast Meats	-3.53	2,264	\$15.61	617	\$19.13
A08	Boys' Clothing or Accessories	-3.55	1,471	\$231.16	530	\$302.89
R02	Cable or Satellite Television Service	-3.57	3,205	\$71.41	1,170	\$77.58
F03	Rice, Pasta, or Cornmeal	-3.61	1,462	\$8.12	453	\$11.83
G06	Electric Personal Care Appliances such as Shavers or Hair Dryers	-3.73	1,500	\$72.73	586	\$125.30
A16	Girls' Clothing or Accessories	-3.76	1,446	\$235.08	548	\$304.63
A18	Boys' or Girls' Footwear	-3.97	820	\$130.75	349	\$171.91
F05	Fresh Biscuits, Rolls, Bagels, or Muffins	-3.98	2,084	\$9.42	618	\$12.22
F02	Breakfast Cereal	-3.99	1,888	\$9.90	569	\$12.50
F31	Dried or Other Processed Fruits or Vegetables	-4.05	979	\$15.78	302	\$23.48
A15	Women's Active Sportswear or Playwear	-4.06	2,086	\$174.38	764	\$235.65
F56	Dental or Shaving Products including Nonelectric Articles	-4.10	1,483	\$20.13	440	\$26.25
F55	Hair Products such as Shampoos, Sprays, Pins or Combs	-4.44	1,733	\$15.49	655	\$20.72
G20	Infants' Equipment such as Strollers, Car Seats, Bottles or Dishes	-4.50	913	\$420.27	379	\$706.37
H09	Household Linens, such as Kitchen or Bathroom Towels, Bedding, or Tablecloths	-4.60	1,242	\$159.26	512	\$261.29
F13	Chicken or Other Poultry including Turkey	-4.67	3,212	\$20.08	1,009	\$25.22
E09	Local Telephone Service	-4.78	4,000	\$43.88	1,449	\$48.20
H32	Household Laundry and Cleaning Products or Supplies	-4.80	1,882	\$38.02	663	\$47.99
G11	Laundry or Dry Cleaning Services	-5.06	1,611	\$46.31	542	\$62.97
A20	Infants' or Toddlers' Clothing or Accessories	-5.16	1,406	\$169.38	485	\$251.59

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E16	Cellular Telephone Service	-5.59	3,199	\$87.04	1,187	\$102.19
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Appendix B - Comparison of POPSCAT Expenditure Means for Cell Phone-Only and Landline/Cell Phone and Landline-Only Telephone Consumer Units in the Consumer Expenditure Survey⁸

POPSCAT	POPSCAT Title	T Statistic	Cell Phone-Only Consumer Unit Expenditure Reports	Cell Phone-Only Consumer Unit Expenditure Mean	Landline and Cell Phone/Landline-Only Consumer Unit Expenditure Reports	Landline and Cell Phone/Landline-Only Consumer Unit Expenditure Mean
E14	Home or Cellular Telephones, Answering Machines, or Other Phone Accessories	-2.30	305	\$123.53	2,235	\$106.38
T19	Taxi Fare	-1.25	419	\$90.11	2,934	\$78.30
E03	Encyclopedias or Other Sets of Reference Books	-0.91	5	\$152.20	47	\$77.81
G20	Infants' Equipment such as Strollers, Car Seats, Bottles or Dishes	-0.88	55	\$161.16	311	\$135.28
E15	Calculators, Typewriters, or Other Information Processing Equipment	-0.83	36	\$113.78	348	\$83.98
R31	Books Purchased Through Book Clubs	-0.78	41	\$96.61	598	\$75.75
H28	Power Tools	-0.66	111	\$267.16	1,024	\$237.63
H37	Moving, Storage, or Freight Services	-0.60	138	\$735.43	670	\$635.63
T08	Vehicle Parts or Accessories	-0.42	579	\$138.60	3,916	\$131.87
R04	Blank or Pre-recorded Video Cassettes and Video Discs	-0.34	815	\$91.16	4,976	\$88.77
A17	Men's Footwear	-0.30	696	\$119.10	4,733	\$117.53
H31	Lawn or Garden Supplies or Insecticides	-0.17	29	\$45.30	739	\$43.30
H14	Infants' Furniture	-0.17	59	\$287.49	317	\$278.16
R14	Bicycles or Bicycling Accessories	-0.16	97	\$249.75	683	\$243.50
R19	Photographer's Fees	-0.15	105	\$260.29	1,035	\$251.05
T18	Intracity Mass Transit	0.02	554	\$221.71	3,809	\$222.14
E05	Tuition or Fixed Fees for Private Elementary or High Schools	0.07	31	\$4,117.94	567	\$4,254.44
R22	Video Game Hardware, Cartridges, Disks or Accessories	0.10	308	\$186.43	2,150	\$187.75
T09	Motor Oil, Coolants, or Fluids	0.14	1,206	\$17.72	8,026	\$17.88
A12	Women's Suits or Suit Components	0.26	84	\$239.45	979	\$252.01

⁸ Sorted by T-Statistic, 90% Significance Level used

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R24	Musical Instruments or Musical Accessories	0.38	56	\$318.13	535	\$343.67
T14	Local Vehicle Registration	0.39	82	\$111.11	728	\$117.13
A10	Women's Dresses	0.51	294	\$179.87	2,861	\$193.15
G13	Clothing Rental, Alterations or Repairs	0.51	158	\$65.85	1,363	\$69.76
H29	Non-powered Tools, or Miscellaneous Hardware	0.62	169	\$253.59	1,490	\$298.94
R10	Pet Services	0.63	136	\$202.75	1,716	\$229.76
T10	Motor Vehicle Body Work	0.70	64	\$558.63	565	\$632.22
A07	Men's Pants, Jeans or Shorts	0.70	615	\$126.42	4,725	\$131.85
G14	Watch or Jewelry Repair	0.88	65	\$42.54	968	\$53.16
T02	New Motorcycles	0.92	10	\$8,894.80	56	\$10,471.70
A02	Men's Coats or Jackets	0.93	243	\$116.77	1,739	\$124.58
A14	Women's Hosiery or Accessories	0.94	483	\$61.52	4,157	\$69.88
G15	Checking Accounts, Credit Card Fees, or Other Bank Services	1.12	699	\$64.17	4,361	\$68.19
A01	Men's Suits or Blazers	1.15	131	\$287.13	1,292	\$337.89
H18	Washers or Dryers	1.27	101	\$715.87	904	\$820.14
G09	Legal Services	1.32	119	\$1,470.36	913	\$1,929.84
T17	Ship Travel or Passenger Cruises	1.45	104	\$425.36	1,143	\$597.42
A04	Men's Accessories such as Ties, Belts, or Wallets	1.46	230	\$45.93	1,603	\$55.91
G12	Shoe Repair or Other Shoe Services	1.46	46	\$35.57	452	\$47.85
A05	Men's Active Sportswear such as Exercise Apparel or Bathing Suits	1.46	138	\$64.91	1,190	\$75.08
A23	Jewelry	1.49	413	\$403.97	3,217	\$505.38
A21	Infants' or Toddlers' Underwear or Diapers	1.52	318	\$168.32	1,976	\$184.10
H25	Non-Electric Kitchen Utensils, Cookingware or Bakeware	1.53	231	\$67.13	1,591	\$88.64
R23	Sewing Machines, Fabric or Sewing Supplies	1.60	188	\$83.11	2,021	\$130.41
H90		1.61	26	\$2,193.65	272	\$2,834.78
H27	Paint, Wallpaper Tools, or Related Supplies	1.67	104	\$155.53	1,011	\$194.50
E04	Tuition or Fixed Fees for a College or University	1.83	302	\$3,391.51	1,534	\$4,031.03
A03	Men's Socks, Underwear, Sleepwear or Bathrobes	1.88	487	\$39.67	3,571	\$44.45

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R13	Unpowered Boats or Trailers	1.88	7	\$4,525.86	71	\$8,135.69
E12	Computer Software or Accessories	1.98	230	\$115.68	1,820	\$141.69
A13	Women's Underwear or Nightwear	2.00	492	\$68.63	4,679	\$77.25
T04	Car, Truck, or Van Rental	2.05	185	\$289.94	1,377	\$360.39
H15	Outdoor Furniture	2.22	58	\$273.69	565	\$455.81
H04	Other Household Fuels For Heating or Cooking such as Propane, Firewood, or Coal	2.29	109	\$264.50	1,486	\$356.90
R18	Cameras or Other Photographic Equipment excluding Film	2.35	170	\$254.63	1,274	\$316.70
R06	Auto or Home Audio Equipment	2.39	245	\$191.31	1,838	\$244.66
R16	Hunting, Fishing, or Camping Equipment	2.44	145	\$172.80	959	\$252.97
E07	Tuition or Fixed Fees for Technical or Vocational Schools	2.47	29	\$588.52	299	\$1,133.46
A22	Watches	2.51	164	\$97.20	1,717	\$150.10
R17	Film or Film Development Supplies	2.53	218	\$25.44	2,259	\$30.79
G02	Tobacco Products Other Than Cigarettes	2.58	154	\$232.40	698	\$307.16
R11	Veterinarian Services	2.63	259	\$315.65	2,925	\$396.80
H39	Reupholstery of Household Furniture	2.70	17	\$168.88	227	\$388.74
R07	Prerecorded or Blank Audio Tapes, CDs or Records	2.71	857	\$68.16	5,357	\$76.75
H26	Indoor Plants or Fresh Cut Flowers	2.80	465	\$92.60	4,889	\$132.76
H38	Major Appliance Repair	2.83	58	\$143.52	1,573	\$201.01
A20	Infants' or Toddlers' Clothing or Accessories	2.88	471	\$104.50	3,722	\$125.26
E10	Long Distance Telephone Services	2.88	290	\$113.54	17,590	\$156.30
R29	Single Copy Newspapers or Magazines	2.89	743	\$29.72	4,766	\$34.72
R03	VCRs, Camcorders, or Other Video Equipment	2.96	161	\$130.07	1,317	\$181.14
R01	Televisions	2.97	270	\$721.75	1,899	\$883.25
T12	Motor Vehicle Repair	3.01	601	\$534.95	4,858	\$641.59
G10	Funeral Services	3.12	40	\$873.28	652	\$1,654.44
G16	Tax Return Preparation or Other Accounting Services	3.17	217	\$183.37	2,398	\$364.16
H17	Refrigerators or Home Freezers	3.18	93	\$687.94	817	\$906.56
A19	Women's Footwear	3.30	848	\$105.95	6,731	\$123.01
H23	Household Decorative Items Including Clocks or Lamps	3.30	472	\$98.60	3,674	\$233.97

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H22	Heating or Cooling Equipment or Home Safety Devices	3.30	229	\$101.32	1,677	\$148.96
H24	Dishes, Glassware, or Flatware	3.35	518	\$58.44	3,046	\$81.58
A15	Women's Active Sportswear or Playwear	3.36	203	\$70.67	1,804	\$91.53
G06	Electric Personal Care Appliances such as Shavers or Hair Dryers	3.38	241	\$40.85	1,464	\$51.71
F54	Catered Events or Board	3.40	269	\$685.31	1,456	\$1,087.36
R09	Pets, Pet Supplies or Accessories	3.53	722	\$206.51	5,886	\$254.30
H07	Floor Coverings such as Hard Surface Tiling, Carpets or Scatter Rugs	3.54	227	\$456.19	1,781	\$808.87
H30	Powered Lawn or Garden Equipment or Other Outdoor Items	3.61	128	\$272.81	1,389	\$483.68
R05	Rental of Video Tapes or Video Discs	3.71	1,039	\$55.12	5,453	\$63.55
R12	Outboard Motors or Powered Sports Vehicles	3.72	10	\$30.70	157	\$5,947.78
E11	Personal Computers or Peripheral Equipment	3.72	324	\$574.97	2,405	\$714.09
T95	Train Fares	3.75	202	\$83.78	1,770	\$132.52
G19	Luggage, Briefcases, or Other Carrying Cases	3.77	63	\$82.67	767	\$123.77
H21	Small Electric Kitchen Appliances	3.82	422	\$54.25	3,089	\$73.77
E01	College or University Level Textbooks	3.89	325	\$396.85	1,212	\$496.55
H40	Inside Home Maintenance or Repair	4.06	67	\$698.43	1,224	\$1,223.39
E02	Elementary or High School Textbooks	4.08	131	\$98.06	1,496	\$142.61
H10	Bedroom Furniture Including Mattresses and Springs	4.15	251	\$743.90	1,579	\$1,045.40
T94	Bus Fares	4.18	197	\$48.30	1,813	\$72.44
T16	Automobile Service Clubs	4.21	122	\$79.51	2,247	\$105.38
A06	Men's Shirts, Sweaters, or Vests	4.27	963	\$107.74	6,351	\$127.05
H11	Sofas, Slipcovers, or Decorative Pillows	4.37	270	\$564.95	1,582	\$870.84
H13	Kitchen or Dining Room Furniture	4.58	123	\$423.15	639	\$883.05
A18	Boys' or Girls' Footwear	4.66	436	\$94.23	3,666	\$120.31
H12	Living Room Chairs or Living Room Tables	4.82	175	\$342.34	1,274	\$593.91
E06	Day Care Providers including Nursery Schools	4.91	266	\$1,613.26	1,857	\$2,405.14
H20	Vacuums or Other Electric Floor Cleaning Equipment	5.01	165	\$107.14	965	\$182.65
T92	State Vehicle Reg., License, and Taxes	5.07	932	\$114.83	7,447	\$141.45
R20	Film Development	5.16	421	\$41.92	3,531	\$57.65

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G01	Cigarettes	5.29	854	\$636.28	3,980	\$779.31
H08	Window Coverings such as Curtains, Drapes or Blinds	5.41	250	\$149.83	1,789	\$348.49
T07	Tires	5.50	405	\$301.54	3,140	\$384.39
R15	General Sports Equipment	5.67	392	\$189.55	2,801	\$293.13
T03	Leased Cars, Trucks, or Vans	5.82	96	\$2,398.76	893	\$3,944.38
A09	Women's Outerwear	5.86	292	\$91.55	2,754	\$132.58
H03	Fuel Oil	5.92	52	\$621.08	1,029	\$1,087.09
T15	Parking Fees or Tolls	6.00	851	\$84.13	6,245	\$120.03
A16	Girls' Clothing or Accessories	6.03	386	\$176.84	3,725	\$255.33
R27	Admissions to Sporting Events	6.14	686	\$92.06	4,600	\$160.05
A08	Boys' Clothing or Accessories	6.20	355	\$145.62	3,524	\$205.06
R28	Recreational Lessons or Instruction	6.48	151	\$382.71	2,043	\$728.17
G11	Laundry or Dry Cleaning Services	6.49	1,345	\$139.94	7,266	\$176.16
R21	Toys, Games, Hobbies, or Playground Equipment	6.63	683	\$166.20	5,045	\$237.02
E16		6.64	2,919	\$494.57	10,590	\$559.60
H09	Household Linens, such as Kitchen or Bathroom Towels, Bedding, or Tablecloths	6.69	854	\$97.43	5,776	\$131.73
H36	Gardening or Lawn Care Services	6.93	226	\$157.38	4,145	\$361.95
H19	Stoves, Ovens or Microwave Ovens	7.64	179	\$213.72	1,077	\$535.44
H06	Garbage or Trash Collection Service	7.67	784	\$121.79	8,325	\$164.34
H16	Occasional Furniture such as Bookcases, Desks, or Ottomans	8.37	197	\$224.77	1,313	\$561.94
A11	Women's Tops, Skirts, Pants, or Shorts	8.48	1,191	\$186.50	9,397	\$254.46
H35	Housekeeping Services	9.52	68	\$416.32	1,586	\$1,006.59
E13	Online or Other Information Services	9.53	1,196	\$162.79	10,878	\$202.60
T93	Airline Fares	9.54	490	\$685.03	3,985	\$1,105.83
R25	Club Membership Dues such as Recreational Clubs, Fraternal or Civic Organizations, or Fees Paid for Participant Sports	10.17	948	\$240.07	7,019	\$437.70
R32	Books Not Purchased Through Book Clubs	10.31	740	\$72.63	5,469	\$114.51
T11	Motor Vehicle Maintenance, Inspections, or Towing	11.08	1,573	\$143.84	11,212	\$216.36

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R26	Admissions such as Movies, Concerts, or Theme Parks	13.03	1,441	\$137.19	8,562	\$228.55
H02	Lodging Away From Home such as Hotels, Motels, or Vacation Rentals	13.08	587	\$454.85	5,355	\$894.28
R30	Newspaper or Magazine Subscriptions	13.49	362	\$58.36	6,094	\$103.39
R02	Cable or Satellite Television Service	14.71	1,791	\$349.02	14,239	\$451.87
H05	Residential Water or Sewer Service	18.75	1,220	\$211.09	11,411	\$326.19
G08	Haircuts or Other Personal Care Services	19.88	1,870	\$153.88	13,219	\$259.49
T05	Gasoline, Diesel, or Alternative Fuels	21.44	2,648	\$1,093.67	16,207	\$1,584.53