Research summaries

Consumer expenditures on travel, 1980–87

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With worldwide sales of $2 trillion, travel and tourism are the world's largest civilian industry.[1] At the same time, Americans are apparently spreading their vacations more evenly throughout the year, thus smoothing the seasonal variation seen in patterns of travel.[2] The industry is expected to grow during the 1990's. For example, the Bureau of Labor Statistics projects strong increases in the employment of travel agents, pilots, and flight attendants.[3] Given the importance of this industry and the changing habits of its consumers, it is interesting to compare recent patterns of expenditure with earlier patterns to determine whether other significant changes have occurred. This report is based on data collected in the 1987 Consumer Expenditure Survey.[4]

In an earlier study, Alice Lippert used results from the 1980–81 survey to examine travel spending of urban consumer units[5] in 1972–73 and 1980–81. She found few differences in spending between the two periods.[6] However, between 1980 and 1987, some differences were observed. Although consumers spent the same proportion of their total budgets on vacations, they allocated their dollars differently.

Tables 1 and 2 show demographic characteristics, travel expenditures, and detailed data by income quintile and age of reference person in 1980 and 1987.

Vacations and pleasure trips

The main components of the budget for vacations and pleasure trips[7] to be discussed here are transportation, food and beverages, and lodging.

Americans chose nearly identical travel budgets in 1980 and 1987. Vacation and pleasure trips accounted for 3.6 percent of total expenditures for all families in 1980 and 3.7 percent in 1987. In 1980, ranked by income, Americans in the middle-income group[8] allocated the lowest share (2.8 percent) of their spending to vacations and pleasure trips. The highest income group allocated the most (4.4 percent). In 1987, the two lowest groups spent the smallest share[9] (2.8 percent); not surprisingly, the wealthiest group still spent the highest share (4.3 percent).

When classified by age of householder,[10] average travel expenditures as a proportion of the budget ranged from 3.0 percent (for those 25 to 34) to 4.6 percent (for those 55 to 64) in 1980. In 1987, the range widened from 2.8 percent (for those 25 to 34) to 4.9 percent (for those 65 to 74).

Transportation

Of the four components of the travel budget, the largest percentage change—and only decline—in expenditures was in transportation. This was due to a large decrease in expenditures for gasoline and motor oil. Other transportation expenses increased.

For all families, transportation expenditures fell as a share of the travel budget from 47 percent in 1980 to 39 percent in 1987. The largest decline was for the middle-income group, whose share decreased from 52 percent to 40 percent, reflecting a decline in gasoline and motor oil expenditures. As expected, upper-income households allocated more for airfare expenditures than did middle-income households, but gasoline shares declined more for upper-income households.

Similarly, families ages 25 to 74 allocated between 6 percent and 10 percent fewer vacation dollars to transportation in 1987 than they did in 1980. The decline for families under 25 was not statistically significant; the share spent by families over 75 was nearly identical in both years.

Gasoline. Gasoline and motor oil expenditures for travel decreased—not surprisingly—about 14 percent for all families. In 1979 and 1980, oil shocks sharply drove up gasoline and motor oil prices, resulting in large shares of travel expenditures being spent on transportation costs. In 1986, prices plummeted throughout the year and did not fully recover by 1987, resulting in lower transportation costs even for the same level of travel expenditures. According to the Consumer Price Index (CPI–U), prices of motor fuel, motor oil, coolant, and other products declined 21 percent from 1980 to 1987.

Although reductions were significant for households in all but the second income quintile, the sharpest declines occurred at the lowest and highest ends of the income distribution. In 1980, members of the lowest income quintile spent about 40 percent of their travel budget on gasoline and motor oil, compared with 26 percent in 1987. Consumers in the highest income group spent 36 percent of their travel budget for gasoline and motor oil in 1980 but only about 20 percent in 1987.

Similarly, gasoline and motor oil expenditures declined significantly for all households except those 75 and older, whose expenditures were far below average in both years. Householders 65 to 74 experienced the largest decline in gasoline share—from 43 percent to 22 percent. Those ages 55 to 64 showed the smallest decline, from 35 percent to 24 percent.

Airfares. As a result of Federal deregulation in 1978, the structure of the airline industry has changed dramatically. The consumer survey data for

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1987 suggest that some changes in expenditures have also occurred.

American families spent more of their travel budget for airfares in 1987 than in 1980, with the proportion rising from about 42 percent to almost 57 percent.

In almost every income group, airfares in 1987 took a higher share of transportation expenditures than in 1980. (The share for middle-income consumers appeared to increase, but the change was not statistically significant.) For families in the highest income quintile, airfares increased from 48 percent of their transportation budgets to 60 percent in 1987.

Almost every age group spent more on airfares as a percentage of travel

Table 1. **Annual travel expenditures of consumer units classified by quintiles of income before taxes, interview survey, 1980 and 1987**

Item	All consumer units		Complete reporting of income												Incomplete reporting of income	
			Total reporting		Lowest 20 percent		Second 20 percent		Third 20 percent		Fourth 20 percent		Highest 20 percent			
	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987
Number of consumer units (thousands)	82,052	94,150	69,817	81,070	13,902	16,187	13,983	16,215	13,953	16,215	13,477	16,214	14,002	239	12,235	13,080
Consumer unit characteristics																
Income after taxes[1]	$15,956	$24,871	$15,956	$24,871	$2,308	$4,494	$8,456	$11,424	$13,862	$19,500	$20,203	$30,373	$34,845	$58,477	([1])	([1])
Size of consumer unit	2.7	2.6	2.7	2.5	1.8	1.8	2.3	2.2	2.8	2.6	3.2	2.9	3.5	3.2	2.7	2.7
Age of reference person	46.9	47.0	46.3	47.0	53.7	51.7	49.0	50.7	42.7	44.9	41.7	43.0	44.3	44.8	50.8	47.3
Number in consumer unit:																
Earners	1.4	1.4	1.4	1.3	.6	.6	1.0	.9	1.5	1.4	1.8	1.7	2.2	2.1	1.4	1.5
Children under 18	.8	.7	.8	.7	.4	.4	.6	.6	.9	.7	1.1	.9	1.0	.9	.7	.7
Persons 65 and over	.3	.3	.3	.3	.5	.4	.5	.5	.2	.3	.1	.2	.1	.1	.4	.2
Vehicles	2.0	2.0	2.0	2.0	.9	.8	1.4	1.5	2.0	2.0	2.6	2.5	3.1	3.0	1.0	2.0
Average annual expenditures	$16,184	$23,242	$16,292	$23,307	$7,461	$9,868	$11,044	$14,487	$14,708	$20,288	$19,299	$27,815	$28,875	$44,020	$15,571	$22,837
Vacation and pleasure trips total	581	850	579	835	232	279	352	418	416	633	626	930	1267	1910	591	945
Transportation total	272	334	274	323	118	128	187	192	216	256	290	351	555	686	264	401
Gas and oil for own vehicles	112	90	115	92	48	33	73	63	101	92	151	117	202	153	93	76
Plane fares	115	189	112	176	46	66	70	98	85	121	92	182	268	410	129	273
Other[2]	46	55	46	55	25	28	45	31	30	44	47	52	85	122	42	51
Food and beverages total	146	239	147	235	54	72	79	112	98	187	176	277	325	527	141	263
Lodging	104	186	103	184	30	55	59	72	61	122	104	184	251	488	109	194
Entertainment, recreation, and other expenses[3]	59	91	56	92	22	25	27	41	41	67	55	118	135	210	77	87
Allocation of expenditure shares[4]																
Vacation and pleasure trips total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Transportation total[5]	46.8	**39.3	47.3	**38.7	50.9	45.9	53.1	45.9	51.9	**40.4	46.3	**37.7	43.8	**35.9	47.7	42.4
Gas and oil for own vehicles[6]	41.2	**26.9	42.0	**28.5	40.7	**25.8	39.0	32.8	46.8	*35.9	52.1	**33.3	36.4	**22.3	36.2	19.0
Plane fares[6]	42.3	**56.6	40.9	**54.5	39.0	*51.6	37.4	*51.0	39.4	47.3	31.7	**51.9	48.3	*59.8	48.9	68.1
Other[6]	16.9	16.5	16.8	17.0	21.2	21.9	24.1	*16.1	13.9	17.2	16.2	14.8	15.3	17.8	15.9	12.7
Food and beverages total[5]	25.1	**28.1	25.4	**28.1	23.3	25.8	22.4	26.8	23.6	*29.5	28.1	29.8	25.7	27.6	23.9	27.8
Lodging[5]	17.9	**21.9	17.8	**22.0	16.4	19.7	16.8	17.2	14.7	*19.3	16.6	*19.8	19.8	*25.5	18.4	20.5
Entertainment, recreation, and other expenses[5]	10.2	10.7	9.7	**11.0	9.5	9.0	7.7	9.8	9.9	10.6	8.8	**12.7	10.7	11.0	13.0	9.2

[1] Income values are derived for "complete income reporters" only. The distinction between complete and incomplete income reporters is based in general on whether the respondent provided values for major sources of income, such as wages and salaries, self-employment income, and Social Security income. No significance tests were conducted for incomplete reporters; expenditures are reported for informational purposes only.

[2] Other includes trip expenditures for train, bus, and boat fares; taxis; tolls; rented motor vehicles; and other vehicle expenses.

[3] Category includes expenditures for admission to movies, sporting events, and other activities; fees for participant sports (for example, golf or bowling); other entertainment and recreation expenditures including souvenirs, passports and visas, and other expenses.

[4] Shares may not add to 100.0 due to rounding.

[5] Vacation and pleasure trips equal 100.0.

[6] Transportation equals 100.0.

* Change in share is significant at the 95-percent confidence level.

** Change in share is significant at the 99-percent confidence level.

Table 2. **Annual travel expenditures of consumer units classified by age of householder, interview survey, 1980 and 1987**

Item	All consumer units		Under 25		25 to 34		35 to 44		45 to 54		55 to 64		65 to 74		75 and older	
	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987	1980	1987
Number of consumer units (in thousands)	82,052	94,150	8,130	7,811	18,840	21,345	13,480	18,747	11,907	13,395	12,666	13,080	10,751	11,578	6,278	8,194
Consumer unit characteristics																
Income after taxes[1]	$15,959	$24,871	$9,517	$11,693	$16,696	$25,322	$20,340	$32,666	$22,554	$33,064	$17,544	$28,137	$9,566	$17,637	$7,929	$12,280
Size of consumer unit	2.7	2.6	1.8	1.8	2.9	2.8	3.9	3.4	3.5	2.9	2.3	2.4	1.9	1.9	1.9	1.5
Age of reference person	46.9	47.0	21.6	21.6	29.5	29.6	39.2	39.1	49.6	49.2	59.3	59.6	69.3	69.1	80.3	80.2
Number in consumer unit:																
Earners	1.4	1.4	1.3	1.2	1.5	1.5	1.9	1.8	2.2	2.0	1.4	1.4	.5	.6	.3	.2
Children under 18	.8	.7	.4	.4	1.2	1.1	1.8	1.5	.9	.6	.3	.3	.1	.1	.0	.0
Persons 65 or over	.3	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.1	1.3	1.3	1.4	1.3
Vehicles	2.0	2.0	1.3	1.2	2.0	1.9	2.4	2.4	2.9	2.7	2.2	2.3	1.4	1.6	.8	.9
Average annual expenditures	$16,184	$23,242	$10,745	$13,996	$17,181	$22,974	$20,614	$29,948	$21,515	$30,246	$16,653	$24,408	$10,744	$18,062	$8,984	$11,418
Vacation and pleasure trips total	581	850	394	481	514	668	705	1004	762	1127	763	1106	460	929	257	349
Transportation total	272	334	198	215	248	275	313	387	349	409	366	425	215	366	119	163
Gas and oil for own vehicles	112	90	96	68	112	87	129	101	142	118	129	106	93	82	34	31
Plane fares	115	189	72	119	96	155	131	225	158	227	169	250	78	203	61	82
Other[2]	46	55	30	28	39	33	53	61	48	65	68	69	43	81	24	49
Food and beverages total	146	239	93	132	129	191	185	281	196	335	180	311	121	252	60	80
Lodging	104	186	41	78	76	124	133	222	140	257	153	259	89	219	62	83
Entertainment, recreation, and other expenses[3]	59	91	61	55	61	78	75	114	78	126	63	110	35	91	15	24
Allocation of expenditure shares[4]																
Vacation and pleasure trips total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Transportation total[5]	46.8	**39.3	50.3	44.7	48.2	*41.2	44.4	*38.5	45.8	**36.3	48.0	**38.4	46.7	*39.4	46.3	46.7
Gas and oil for own vehicles[6]	41.2	**26.9	48.5	**31.6	45.2	**31.6	41.2	**26.1	40.7	**28.9	35.2	**24.9	43.3	**22.4	28.6	19.0
Plane fares[6]	42.3	*56.6	36.4	**55.3	38.7	*56.4	41.9	*58.1	45.3	**55.5	46.2	**58.8	36.3	**55.5	51.3	50.3
Other[6]	16.9	16.5	15.2	13.0	15.7	12.0	16.9	15.8	13.8	15.9	18.6	16.2	20.0	22.1	20.2	30.1
Food and beverages total[5]	25.1	**28.1	23.6	27.4	25.1	*28.6	26.2	28.0	25.7	*29.7	23.6	*28.1	26.3	27.1	23.3	22.9
Lodging[5]	17.9	**21.9	10.4	**16.2	14.8	*18.6	18.9	22.1	18.4	**22.8	20.1	23.4	19.3	23.6	24.1	23.8
Entertainment, recreation, and other expenses[5]	10.2	10.7	15.5	11.4	11.9	**11.7	10.6	11.4	10.2	11.2	8.3	9.9	7.6	9.8	5.8	6.9

[1] Income values are derived for "complete income reporters" only. The distinction between complete and incomplete income reporters is based in general on whether the respondent provided values for major sources of income, such as wages and salaries, self-employment income, and Social Security income. No significance tests were conducted for incomplete reporters; expenditures are reported for informational purposes only.

[2] Other includes trip expenditures for train, bus, and boat fares; taxis; tolls; rented motor vehicles; and other vehicle expenses.

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* Change in share is significant at the 95-percent confidence level.

** Change in share is significant at the 99-percent confidence level.

expenses in 1987 than in 1980. (The share spent by those age 75 and older remained virtually unchanged.) Consumers ages 65 to 74 showed the largest percentage increase, airfares rising from 36 percent to 55 percent of transportation expenditures for travel.

Deregulation was accompanied by frequent special fares and inducements for air travel, such as family rates. These promotions probably stimulated travel by air, thereby increasing the share for air travel expenditures. Savings from lower gasoline and motor oil expenditures may have also encouraged more air travel.[11]

Food

Families spent 64 percent more on food on trips in 1980 than in 1987, increasing

average expenditures from $146 to $239. Middle-income families spent nearly 91 percent more in 1987 than in 1980, while those in the lowest income group increased their expenditures by one-third. Consumers age 75 and older spent one-third more on food while on vacation in 1987 than in 1980, while those ages 65 to 74 more than doubled their expenditures. Those under age 25 spent 42 percent more.

By comparison, the CPI-U shows that all food and beverage prices rose 31 percent between 1980 and 1987. Prices for food away from home[12] rose at a faster rate—increasing more than 40 percent during the same period.

However, family budget shares did not change appreciably. All families increased their allocation to food on trips from 25 percent in 1980 to 28 percent in 1987. Lower-income families spent 23 percent[13] of total travel expenditures on food in 1980, while upper-income families spent 26 percent. In 1987, lower-income families spent 26 percent, while upper-income families spent 28 percent. Only middle-income families significantly increased their expenditures, with allocations rising from 24 percent in 1980 to 30 percent in 1987.

Families under age 75 spent about 25 percent of total vacation expenditures on food in 1980, and between 27 percent and 30 percent in 1987. Those age 75 and older allocated slightly less (23 percent) in both years. Changes were significant for consumers ages 25 to 34 and 45 to 64. (See table 2.)

Lodging

According to the CPI-U, prices for lodging while out of town increased faster than the general rate of inflation every year between 1980 and 1987. While the overall CPI-U rose 39 percent during this period, lodging prices advanced 66 percent. On average, prices for out-of-town lodging each year rose almost 3 percentage points faster than prices of all goods. At the same time, all consumer units spent a larger share of the vacation and pleasure trip budget on lodging, as the proportion increased from 18 percent to 22 percent in 1987. Expenditure shares for families in the middle- and upper-income quintiles increased between 3 percent and 6 percent. Consumers under age 35 and those 45 to 54 increased shares between 4 percent and 6 percent.

Conclusions

Although households spent the same share of total expenditures on vacations, they allocated their travel dollars differently. Households spent less (fewer dollars and lower shares) on gasoline and motor oil in 1987 and more (dollars and shares) on airfares. Although most families continued to spend about the same amount on food while on vacation, some consumers spent more on lodging. □

Footnotes

ACKNOWLEDGMENT: Steve Montgomery of the Consumer Prices and Consumption Studies division provided tables from which the data presented here are derived.

[1] See "The Business of Going Away," *The Economist*, Apr. 15, 1989, p. 73.

[2] See Asra Q. Nomani, "Vacationers Rewriting the Travel Calendar by Taking Time Off Throughout the Year," *The Wall Street Journal*, Dec. 22, 1988.

[3] See "1988–89 Job Outlook in Brief," reprinted from the Spring 1988 issue of *Occupational Outlook Quarterly* (Bureau of Labor Statistics), pp. 33–44.

[4] Although travel expenditures are included in the survey, they are not published as separate items. They appear in broader categories (for example, "gasoline and motor oil" includes purchases both at home and on trips).

[5] A consumer unit is a single person or group of persons in a sample household related by blood, marriage, adoption, or other legal arrangement, or who share responsibility for at least 2 out of 3 major types of expenses—food, housing, and other expenses. The terms "household" and "family" are used for convenience, although there may be more than one consumer unit in a household and one-person families are included.

[6] See Alice A. Lippert, "Trip expenditure comparisons from 1972–73 to 1980–81," *Monthly Labor Review*, July 1985, pp. 46–48. Lippert's results and those shown here are not comparable because Lippert used only urban consumer data, and both urban and rural families are included in the data shown here.

[7] The terms "travel" and "vacation and pleasure trips" are used interchangeably. The Consumer Expenditure Survey definition of "trips" includes all overnight trips and all-day trips of 75 miles or more. Trips fully reimbursed by an employer or a third party and commuting to work or school are not included in the "trip" definition.

[8] Data are for consumer units defined as complete income reporters. The distinction between complete and incomplete income reporters is based in general on whether the respondent, when surveyed, provides values for major sources of income, such as wages and salaries, self-employment income, and Social Security income. Even "complete" income reporters may not have provided a full accounting of all income from all sources.

[9] Based on a weighted average of the first and second income quintiles.

[10] Each consumer unit has a householder or "reference" person. This person is the first member mentioned by the survey respondent when asked by the interviewer to name the person or persons who own or rent the home. It is with respect to that person that consumer units are classified.

[11] Further proof that people flew more and drove less in 1987 comes from the *Statistical Abstract*. In 1980, the volume of domestic intercity passenger traffic totaled 1,558 billion. Private automobiles accounted for 1,494 billion passenger-miles (that is, the movement of one passenger for the distance of one mile). Private automobiles accounted for 1,300 billion (83 percent) of total passenger-miles, while domestic airways accounted for 219 billion (14 percent) of total volume. (The rest of the total was shared by buses and railroads.) Preliminary 1987 figures show that the volume of passenger-miles totaled 1,870 billion. Private automobiles accounted for 1,494 billion (80 percent) of the total, while domestic airways accounted for 341 billion (18 percent). Although these figures include business travel, it is probable that private vacation travel followed a similar pattern. (See *Statistical Abstract of the United States: 1989*, 109th edition (Bureau of the Census, 1989).

[12] This includes all food away from home, not just that purchased on trips.

[13] Figures for lower- and upper-income families are based on weighted averages.

Appendix

The Consumer Expenditure Survey is the most comprehensive source of detailed information on household expenditures and income related to the socioeconomic and demographic characteristics of the U.S. population. Before 1980, the survey had been conducted about every 10 years, but now it is conducted on a continual basis.[1] The survey consists of two major components: the diary and the quarterly interview. The diary survey is designed to collect information on frequently purchased items, such as food and household products. Expenditures on trips are not recorded in the diary survey. The interview survey is designed to collect information on relatively large items such as housing, education, vehicles, and major appliances. In addition, data are collected for expenditures which occur at regular intervals, such as rent and utility bills. Expenditures on vacation and pleasure trips are included in the quarterly interview survey.

The Bureau of the Census collects the data for the Bureau of Labor Statistics. Each survey contains its own independent sample of approximately 5,000 consumer units. The diary survey is completed by participating households over a 2-week period. The interview survey is conducted with rotating panels of consumers on a quarterly basis. Consumers are interviewed for 5 consecutive quarters; one-fifth of the sample is new to the survey each quarter.

Statistical test

The Z-test. When testing differences between means of two large samples,[2] a Z-test is often employed. The variable Z is defined as having a standard normal distribution around its mean (that is, a graph of its distribution is shaped like the familiar "bell-curve," where the "peak" value represents the mean). The probability of Z being greater than (or less than) any number is known: there is no uncertainty involved in determining this probability. If the large sample is known (or assumed) to have a standard normal distribution, then using the Z-test, the probability that the sample mean is greater than (or less than or not equal to) a predetermined value can be found. If the large sample is known (or assumed) to have a standard normal distribution, it can be transformed so that:

$$Z^* = (x-u) / (s / N^{0.5})$$

where:

Z^* = the computed value of Z;
x = the mean of the test sample;
u = some predetermined value;
s = the (estimated) standard deviation of the test sample; and
N = the size of the test sample. (Notice it is the square root of N that is actually used in the above equation.)

The above equation can be used to test, at any given level of probability, the hypothesis that X and U are equal. If the test is conducted at the 95-percent confidence level (that is, there is a 95-percent probability that any appearance of difference between the two values is because of random sampling error rather than "true" differences in the populations), the appropriate value of Z^* is approximately 1.96. If the absolute value from the right-hand side of the equation is greater than 1.96, then the hypothesis that X and U are equal can be rejected at the 95-percent confidence level. If the absolute value is greater than 2.58, then the hypothesis can be rejected at the 99-percent confidence level. Obviously, the higher the absolute value of the right-hand side of the equation, the greater the confidence level at which the hypothesis of equality can be rejected, and the lower the probability of error in such a rejection. (The probability of error is 1 minus confidence level, or 5 percent at the 95-percent confidence level.)

Sometimes means of two populations are compared. In this way X now becomes the mean for the first sample (for example, mean expenditure by type of family in 1987), and U becomes the mean for the second sample (for example, mean expenditure by the same type of family in 1980). However, the denominator becomes a little more complicated. The new equation can be written as:

$$Z^* = (X_{mean} - U_{mean}) / (S_{x+u})^{0.5}$$

where the new denominator is the pooled standard error, characterized by the variable S_{x+u}, is specified as follows:

$$S_{x+u} = (S_x^2/N_x) + (S_u^2/N_u)$$

where:

S_x = the standard deviation for the first sample;
N_x = the size of the first sample;
S_u = the standard deviation for the second sample; and
N_u = the size of the second sample.

The present case is most like the test for differences in means just described, except that it is the size of expenditure shares, and not actual means, that is compared with the Z-test. The numerator consists of the 1987 share for a certain family type minus the 1980 share for the same type of family. To test for the difference between expenditures for transportation on trips as a share of total vacation expenditures in 1980 and 1987, then,

$$X_{shr} = T_{1987} / V_{1987}$$
$$U_{shr} = T_{1980} / V_{1980}$$

where:

T = transportation on trips; and
V = total vacation expenditures.

In this case, S_{x+u} is a more complicated function. Now it is true that

$$S_{x+u} = (X_{shr})^2[CV^2(T_{1987}) + CV^2_{(V1987)} - 2(X_{shr})(CV^2_{(T1987)})] + (U_{shr})^2[CV^2_{(T1980)} + CV^2_{(V1980)} - 2(U_{shr})(CV^2_{(T1980)})]$$

where:

$CV_{(T1987)}$ = the coefficient of variation[3] for 1987 transportation on trips expenditures;
$CV_{(V1987)}$ = the coefficient of variation for 1987 total vacation expenditures;
$CV_{(T1980)}$ = the coefficient of variation for 1980 transportation on trips expenditures; and
$CV_{(V1980)}$ = the coefficient of variation for 1980 total vacation expenditures.

The formula for testing differences in shares still remains:

$$Z^* = (X_{shr} - U_{shr}) / (S_{x+u})0.5$$

Footnotes to the appendix

[1]For a complete discussion of the history and methodology of the Consumer Expenditure Survey, see BLS *Handbook of Methods*, Bulletin 2285 (Bureau of Labor Statistics, 1988), ch. 18.

[2]For small samples, a t-test is usually used. As sample sizes grow large, the t distribution approximates the Z-distribution. When testing significance at the 5-percent level for a sample size of 120, the appropriate value of t is about 1.98. When testing significance for a sample whose size approaches infinity, the appropriate value of t is 1.96. Because most t tables show sample sizes skipping from 120 to infinity, a large sample size is defined here to lie somewhere between 120 and infinity. A single critical value below which the sample size is "small" and above which it is "large" is difficult to find. Interpolation yields an estimation of a possible critical range, but still some subjective criteria are undoubtedly used in determining values for critical range. Because the Consumer Expenditure Survey was composed of responses from several thousand consumer units of each type (for example, under age 25 or middle-income quintile) in both 1980 and 1987, defining the sample size as "large" presents no problem.

[3]The coefficient of variation is the standard error of a sample divided by the sample mean.

1989 employee benefits address family concerns

Cathy A. Cooley

Parental leave, typically unpaid, was one of several benefits provided to employees to assist in balancing work and family responsibilities, according to the Bureau of Labor Statistics' recently released 1989 Employee Benefits Survey. The survey presents information on the incidence and detailed characteristics of