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

employee benefits available to full-time workers in private-sector establishments employing 100 or more workers. Among the 1989 findings are that unpaid maternity leave was available to nearly two-fifths of employees, unpaid paternity leave to almost one-fifth; reimbursement accounts to help pay for medical and dependent care expenses were offered to about one-fourth of workers; and flexible work arrangements were provided to one-tenth of employees.

Parental leave plans provide time off for mothers and fathers to care for newborn or newly adopted children. Such plans, as defined in the survey, are separate from other leave benefits, such as short-term disability coverage and paid vacations, which may also be used for parenting purposes. In 1989, 37 percent of employees could take unpaid maternity leave, with the maximum leave available averaging 20 weeks. (See table 1.) Eighteen percent of employees could take unpaid paternity leave, with the maximum leave available averaging 19 weeks. Paid parental leave was rare.

The survey found that 5 percent of employees were eligible for child care benefits subsidized by their employer. These benefits include both on-site and near-site child care expenses. A more common means of assisting employees with child care expenses was through reimbursement accounts, from which employees pay for a variety of qualified expenses. Child care, elderly or dependent care, and other medical care expenses were the most common items covered. Twenty-three percent of employees were eligible for such accounts in 1989, up from 12 percent in 1988. Reimbursement accounts often are funded solely by employees seeking tax advantages through salary reduction arrangements.

For the first time, the survey included information on flexible work schedules. Eleven percent of workers studied had such arrangements available. Flexible schedules give employees the opportunity to begin and end work within a specified range of hours, thereby helping to accommodate family commitments. Limits on the amount of flexibility vary from plan to plan, but generally, employees must be at work during certain midday "core" hours. Fifteen percent of white-collar workers had flexible work schedules available, more than double the coverage for blue-collar workers.

Employers also offered a variety of health-related benefits outside of the traditional health care plans. Employee assistance programs, which provide counseling and referral services for substance abuse and family, financial, legal, and related problems, were available to 49 percent of workers. Wellness programs, designed to encourage healthier lifestyles, were available to 23 percent of employees. These programs typically include health screenings, smoking cessation classes, and guidance on healthier diets.

For the first time, the survey gathered data on the availability of long-term care insurance. Three percent of employees had such insurance plans available to them. Long-term care plans are designed to help pay for protracted nursing home care for employees or dependents, including elderly dependents. (Ordinary health care plans exclude such coverage from the benefits they provide.) Although long-term care plans are typically wholly employee paid, workers gain because coverage is

Table 1. **Full-time employees participating in selected employee benefit programs, medium and large private firms, United States,[1] 1989**

[in percent]

Employee benefit program	All employees	Professional and administrative employees	Technical and clerical employees	Production and service employees
Paid:				
Holidays	97	97	96	97
Vacations	97	98	99	95
Personal leave	22	28	30	14
Lunch period	10	4	4	16
Rest time	71	57	69	80
Funeral leave	84	87	86	80
Jury duty leave	90	95	92	87
Military leave	53	61	57	45
Sick leave	68	93	87	44
Maternity leave	3	4	2	3
Paternity leave	1	2	1	1
Unpaid:				
Maternity leave	37	39	37	35
Paternity leave	18	20	17	17
Sickness and accident insurance	43	29	29	58
Long-term disability insurance	45	65	57	27
Medical care	92	93	91	93
Dental care	66	69	66	65
Life insurance	94	95	94	93
Defined benefit pension	63	64	63	63
Defined contribution plans	48	59	52	40
Retirement[2]	36	43	39	31
Capital accumulation[3]	14	18	14	11
All retirement[4]	81	85	81	80
Flexible benefits plans	9	14	15	3
Reimbursement accounts	23	36	31	11

[1] Survey coverage excludes executives and employees on constant travel, such as airline pilots, as well as data for Alaska and Hawaii. Except for maternity and paternity leave and reimbursement accounts, benefits paid for entirely by the employee were excluded from the tabulations. Professional-administrative and technical-clerical workers are often discussed jointly as white-collar workers. Production-service workers are often called blue-collar workers.

[2] Includes money purchase pension, profit-sharing, savings and thrift, stock bonus, and employee stock ownership plans in which employer contributions must remain in the participant's account until retirement age, death, disability, separation from service, age 59½, or hardship.

[3] Includes plans in which participants may withdraw employer contributions from their accounts without regard to the conditions listed in footnote 2.

[4] Includes defined benefit pension plans and defined contribution retirement plans. Many employees participated in both types of plans.

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available through employers at group insurance rates.

Health care benefits

Ninety-two percent of full-time employees had medical care benefits fully or partially financed by their employer in 1989. Seventy-four percent of those with benefits were in traditional fee-for-service plans. Nontraditional plans, such as health maintenance organizations (HMO's) and preferred provider organizations (PPO's), accounted for 17 percent and 10 percent of medical care participants, respectively. Under PPO's, subscribers are provided health care services at a lower cost if they receive treatment from designated hospitals, physicians, or dentists.

Alcohol and drug abuse treatment coverage was provided to 97 and 96 percent of the medical care participants, respectively. Benefits may be provided for detoxification, rehabilitation services, or both. Detoxification involves supervised medical care to reduce or eliminate the symptoms of chemical dependency. Rehabilitation is designed to alter the behavior of substance abusers, once they are free of acute physical and mental complications. The number of medical care participants with alcohol and drug abuse treatment coverage reported by the survey increased by 21 and 30 percent, respectively, from 1988 to 1989. The increases reflect both a greater incidence of these benefits in medical care plans and a refinement of the survey's procedures for tabulating detoxification benefits.

The survey found a wide range of coverage for less costly alternatives to hospital stays. Three-fourths of the participants with medical care had coverage for home health care, and four-fifths had coverage in extended care facilities. In addition, hospice care, for the terminally ill, was available to approximately two-fifths of participants.

Defined benefit pension plans

Defined benefit pension plans, which specify a formula for determining an employee's annuity, covered 63 percent of full-time workers in 1989, unchanged from the figure in 1988, when the survey expanded to smaller establishments and more service industries.

The survey found that the most common type of defined benefit pension plan is the terminal earnings plan, which bases pension payments on an employee's average earnings in the last few years prior to retirement (usually a 5-year period). In 1989, terminal earnings plans covered 64 percent of participants in defined benefit pension plans. The average benefit formula in such plans was approximately 1.5 percent of annual earnings, multiplied by the number of years of service. More than half of the participants in these plans were subject to a limit on the number of years of service that could be applied toward pension benefits, commonly 30, 35, or 40 years. In addition, benefits were usually coordinated with Social Security payments.

Earnings-based pension formulas are more common among white-collar workers than among blue-collar workers, who often have plans calling for dollar amount benefits based on years of service. In 1989, the monthly benefit under dollar amount formulas averaged about $20 multiplied by the number of years of service. Unlike earnings-based plans, dollar amount plans usually do not limit the number of years of service credited and rarely coordinate benefits with Social Security payments.

Defined contribution plans

Forty-eight percent of employees participated in one or more defined contribution plans in 1989, up from 45 percent in 1988. These plans, which usually specify the employer's contribution but cannot predetermine the employee's actual amount of benefits, include savings and thrift programs (covering 30 percent of full-time workers), profit-sharing plans (16 percent), money purchase pension arrangements (5 percent), and stock ownership plans (3 percent). Most defined contribution plans require employee contributions, but about 30 percent of participants were in plans wholly financed by the employer.

Forty-one percent of workers covered by the survey participated in 401(k) plans (also known as cash or deferred arrangements), which permit pretax employee contributions. Most of these plans were salary reduction plans, allowing employees to reduce their taxable income by making voluntary contributions that are not taxed until withdrawn from the plan. For example, savings and thrift plans commonly allow participants to make pretax savings, some or all of which are matched by the employer.

Life insurance

Life insurance benefits were provided to 94 percent of employees in 1989, with the cost paid entirely by the employer for all but 13 percent of covered workers. For 68 percent of those covered, the amount of life insurance was based on earnings, typically one or two times annual pay. Most of the remaining participants were provided flat dollar amounts of coverage. Flat dollar amounts were most common among blue-collar workers, with the benefit averaging slightly more than $11,000.

Disability income benefits

In 1989, almost all workers were covered by an income protection plan—either sick leave or sickness and accident insurance, or both—in the event of a short-term illness or injury. Sick leave plans, covering 68 percent of all workers studied, but mostly white-collar workers, commonly specified a set number of sick days per year. Workers in such plans who had 1 year of service had an average of 15.4 sick days available; at 20 years of service, the figure rose to 27.8 days.

Forty-three percent of workers surveyed received a sickness and accident insurance plan, and about half of these workers also received sick leave. Sickness and accident insurance, twice as prevalent among blue-collar workers as among white-collar workers, provides either a percentage of pay (commonly 50 percent) or a flat amount per week during a period of disability due to illness or accident. Payments are for a limited period of time, usually 26 weeks.

Forty-five percent of employees had long-term disability insurance coverage. Such coverage is intended to replace income lost during an extended or permanent period of disability. The ma-

jority of workers with long-term coverage would receive between 50 and 60 percent of predisability pay during a period of disability.

Paid time off

Time off with pay is available to employees in a variety of forms, from daily rest breaks to annual vacations lasting several weeks. Most types of paid leave were available to a majority of employees. Exceptions were paid lunch time, averaging 26 minutes a day, which applied to a tenth of workers, and personal (multipurpose) leave, averaging 3.1 days a year, which covered nearly one-fourth of workers. The number of paid holidays averaged 9.2 per year, and the amount of vacation, which commonly increased with length of service, averaged 9.1 days after 1 year, 16.5 days after 10 years, and 20.4 days after 20 years of service. Paid rest time averaged 26 minutes a day, funeral leave 3.3 days per occurrence, and military leave 11.9 days a year. Paid time off for jury duty was usually provided as needed.

Availability of survey results

The Employee Benefits Survey provides data on 32 million full-time employees in 48 States and the District of Columbia. Data represent benefit provisions for workers in about 109,000 establishments employing 100 or more workers in private nonfarm industries. A comprehensive report on the survey, *Employee Benefits in Medium and Large Firms, 1989*, may be purchased this summer from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, or from the Bureau of Labor Statistics Publications Sales Center, P.O. Box 2145, Chicago, IL 60690. □

Characteristics of households with discretionary income

About 26 million American households have some discretionary income, and this income accounts for more than 53 percent of total personal income, according to a 1989 joint study by the Consumer Research Center of The Conference Board and the U.S. Bureau of the Census.

Discretionary income was determined by cross-tabulating and classifying the 60,000 households in the March 1987 Current Population Survey by income, age, occupation, education, number of earners, and other demographic characteristics. After-tax, or spendable, income was then calculated. Households with spendable incomes at least 30 percent higher than average expenditures for their comparable group were considered to have discretionary income. The previous survey of discretionary income was in March 1983.

The total number of households in the United States increased by 5.4 million over the March 1983 to March 1987 period to a total of 89.5 million. The number of households with discretionary income rose by 2.1 million (from 28 percent to 29 percent of households). The mean amount of discretionary income was up 12 percent to $12,330. This translates into a $57 billion increase in aggregate discretionary income to $319 billion, or a 22-percent rise from 1983. The study suggests that this significant increase in the size of discretionary income reflects both recovery from the 1980 and 1981–82 recessions and continued growth of the economy since that time. Mean income of all households rose 11 percent, which is reflected in the large increases in the discretionary income bracket.

The average after-tax income in 1987 was $42,000 for households with discretionary income, compared with $17,000 for all other households and $30,800 for the Nation as a whole. Discretionary income was found largely in the 35–60 age group, and also was prevalent among those in professional and managerial positions. Blue-collar workers' incomes accounted for only 15 percent of discretionary income. A majority of those with discretionary income have college degrees. Almost one-third of white households have discretionary income; black households have 6 percent and Hispanic households have 2 percent of all discretionary income.

The study revealed other characteristics individuals in the discretionary income category share: most are homeowners who pay an average of 26 percent of their earnings in taxes. The homeowners have more discretionary income than do renters, as do those who live in the suburbs, compared with those who live in other areas. Furthermore, households with two or more workers make up 45 percent of all households but almost 65 percent of the country's households with discretionary income. Fewer than 25 percent of homes with discretionary income have only the husband working.

A Marketer's Guide to Discretionary Income also lists discretionary income according to salary, age, race, size of household, number of earners, education, occupation, region, metro and nonmetro residence, and housing tenure. It is available from the U.S. Bureau of the Census. □

—Laurie Lande
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