

Papers from the Conference on Research in Income and Wealth

This issue presents a second group of papers from the "New Horizons in Data Sets" sessions from the fiftieth anniversary meeting of the Conference on Research in Income and Wealth. Three papers appeared in the November 1988 issue of the SURVEY OF CURRENT BUSINESS; a final group will appear in a subsequent issue.

The first paper in this issue grew out of the discussant's remarks on the paper by G. Donald Wood that was published in the November 1988 SURVEY. Alice and Masao Nakamura ask whether the kind of detailed compensation data developed by Wood is necessary for economic analysis or whether wage or earnings information, without detail on nonwage benefits, is sufficient. They show that inferring compensation differentials from information on wage or earnings differentials alone can lead to errors, and they call for expanding the benefits and compensation data to include more occupational, industry, and demographic detail.

The second paper, by Timothy Smeeding, Lee Rainwater, and Rick Simpson, describes an innovation in making existing information more useful by combining surveys from different countries. The objective of this international project is to permit comparisons across countries by using data sets that have been made as comparable as possible by a staff assembled especially for this purpose in Luxembourg. The discussant for this paper, Katharine Abraham, assesses the potential usefulness of the international project for research in labor economics.

All of the papers in the "New Horizons" sessions presented economic information that contributes to improving the NIPA estimates or that provides supplemental data that will be useful for analyzing the NIPA components. For this reason the conference papers are being published in the SURVEY.

Jack E. Triplett

New Measures of Nonwage Compensation Components: Are They Needed?

By Alice Nakamura and Masao Nakamura

Introduction

IN his paper, Donald Wood describes a new measure of labor costs that is estimated using data collected by the Bureau of Labor Statistics to produce the Employment Cost Index.¹ A key feature of these new cost estimates is the detail provided about the nonwage components of labor compensation. This is an important development because more than one-fourth of the total compensation of today's average employee is in the form of some sort of nonwage benefit. The largest category of nonwage benefits are legally required benefits, such as social security, workers' compensation, and unemployment insurance. These legally required benefits now make up almost a third of all nonwage benefit costs.

Despite recognition of the growing importance of nonwage benefits and the consequent implications for analyses and for comparisons of labor costs over time, some economists

have questioned the need for more comprehensive compensation data for cross-sectional analyses. In their widely used undergraduate textbook, Fleisher and Kniesner maintain that nonwage benefits are related to total compensation "more or less consistently by a fraction" (Fleisher and Kniesner 1980, 23); Triplett (1983) terms this the "consistency hypothesis."² If the consistency hypothesis is true, there may be little need for more information about nonwage benefits. However, if the consistency hypothesis is rejected, then there may be a need to invest more resources in providing details about the wage and the nonwage components of compensation for certain industrial, occupational, and other groups of workers. The need for this data might even be a reason for releasing microdata on compensation that the analyst could group and manipulate as desired.

In the following sections, we briefly review evidence that suggests that, for both the United States and Japan, the ratio of nonwage benefits to total compensation varies systematically by the level of total compensation, by the firm size, and by the gender of the employee. We also use data from Japan to examine the interrelationships between certain components of compensation; the results also contradict what we would expect to find if the consistency hypothesis were true. We summarize our conclusions in the last section.

NOTE.—Alice Nakamura and Masao Nakamura are members of the Faculty of Business, University of Alberta, Edmonton, Alberta, Canada. The authors wish to thank Guy H. Orcutt and Jack E. Triplett for their helpful comments.

1. Donald Wood's paper was published in the November 1988 SURVEY OF CURRENT BUSINESS.

2. Triplett has given this hypothesis a name, but he does not accept its validity.

Level of Compensation

The consistency hypothesis is at odds with certain economic expectations. Some nonwage benefits are more like prespecified goods and services than like income (which can be spent or saved as desired). For goods and services that are luxuries, the standard economic argument predicts that demand will rise faster than income. Thus, the demand for nonwage benefits such as paid vacation days would be expected to rise faster than earned income. Other nonwage benefits, such as pension plans, are essentially deferred wage payments. It is sometimes argued that the discount rate for future income falls as the level of current income increases. The progressiveness of Federal and State income tax schedules and the differential tax treatment of wages (and salaries) versus that of nonwage benefits are further reasons why higher wage workers might prefer to receive higher proportions of their total compensation in the form of nonwage benefits.³

A priori reasoning suggests, therefore, that nonwage benefits as a fraction of total compensation should increase as the level of total compensation increases. This result is what Wood (1988) states that he expected to find and what he did find when workers were grouped by industry. However, for the broad occupational groupings of workers that he used, he did not find the expected relationship. Wood writes:

The proportion of total compensation that is accounted for by wages decreases as the level of compensation by industry increases... However, for any level of compensation, blue-collar workers tend to have a lower proportion of total compensation accounted for by wages than do white-collar workers, even though blue-collar workers earn less... Even when blue-collar and white-collar worker groups are considered separately, the expected inverse relationship between the level of compensation and the proportion of compensation accounted for by wages and salaries does not appear (Wood 1988, 38).

Other economists have found evidence of the positive relationship predicted by economic theory between the level of total compensation and the share of nonwage benefits for the United States and for other countries. For instance, the figures shown in table 1 are based on establishment data for Japan that have been aggregated by industry.⁴ The industries for which figures are shown have been arrayed from highest to lowest in terms of the average monthly compensation for regular employees. Reading the figures in the last column of table 1 from bottom to top, it can be seen that average nonwage benefits as a fraction of average total compensation generally rise as the average level of total compensation increases.

Smeeding (1983) obtains a similar result for the United States, using information merged from three data sources. His primary data source was the March 1980 Current Population Survey (CPS), which contains wage and salary income data for a large number of U.S. workers; for each worker, information is also available on whether or not the worker was

3. For information on the demand for various sorts of nonpecuniary job benefits and characteristics, see Atrostic (1982).

4. Benefits, in this case, are evaluated in terms of actual employer costs.

Table 1.—Average Monthly Labor Cost, Cash Earnings, and Total Benefits Per Employee, Japan, 1985¹

[In yen]

Industry	Total compensation	Cash earnings		Wage benefits	
		Yen	Percent of total	Yen	Percent of total
Utilities.....	516,343	401,759	77.8	14,585	22.2
Finance.....	480,845	402,930	83.8	77,915	16.2
Transportation/communication.....	393,016	331,352	84.3	61,664	15.7
Real estate.....	371,579	314,704	84.7	56,878	15.3
Manufacturing.....	365,918	308,344	84.3	57,574	15.7
Construction.....	364,821	309,275	84.8	55,547	15.2
Retail/wholesale.....	321,268	275,450	85.7	45,818	14.3
Service.....	287,924	249,470	86.6	38,453	13.4

1. Figures are per month per regular employee and are calculated using data from the Ministry of Labor (Japan 1978-87).

covered by employer pension or health plans. Then, using microsimulation techniques of the sort pioneered by Orcutt⁵ and industry data on employer outlays for various fringe benefits from the Bureau of Labor Statistics Employer's Expenditure for Employee Compensation Survey and the 1977 Employment Cost Index Survey, Smeeding assigned additional types of fringe benefits and dollar values for the various benefits to the records for individual workers in the CPS data set. Smeeding uses this "adjusted" CPS data to address a number of questions about the wage and nonwage components of total compensation. One of his findings is that "pay for time worked declines as a percentage of earnings as wages rise, indicating that paid leisure (vacations and holidays) and other benefits included in salary increase with earnings" (Smeeding 1983, 253).

Both the nature of the survey data and the definition of benefits used in the Smeeding study differ from those used in the Wood study; thus, it is not surprising that the results of their studies differ. In both the Nathan (1987) and the Wood studies, the data that are published are highly aggregated; if firm sizes, employee characteristics, the distributions of types of benefits, and so forth, vary across the aggregate groups (as it is likely that they do), then one may not be able to form conclusions about the nonwage benefit to compensation ratio from such highly aggregated data. Using the raw microdata for jobs within establishments, the Bureau of Labor Statistics should carry out a further study of this issue.

Firm Size

Using tabulations of unpublished data from the May 1979 CPS,⁶ Oi finds that the percentages of employees receiving important nonwage benefits rise steeply as firm size rises (Oi 1983, 90, table 2.7). For instance, there is a steady rise, as firm size rises, in the percentages of male workers with pension plan coverage and disability insurance coverage.

5. See Orcutt, Greenberger, Korbel, and Rivlin (1961) and Orcutt, Caldwell, and Wertheimer (1976).

6. The pension supplement to the May 1979 Current Population Survey provides information on employee participation in private pension and health insurance plans and firm-employment-size data.

Table 2.—Days and Hours Worked and Paid Vacation Days by Firm Size, Japanese Manufacturing, 1985

Firm size	Average per month		Vacation days per year	
	Days worked	Hours worked	Entitled	Acquired
5-29.....	23.0	182.5		
30-99.....	22.2	183.5	13.1	7.3
100-499 ¹ or 100-999 ²	21.2	179.0	14.7	8.2
500+ ¹ or 1000+ ²	20.3	177.3	17.2	10.3

1. Class limit for columns 1 and 2.
2. Class limit for columns 3 and 4.

Source: Figures are calculated from the tables "Average Monthly Labor Cost Per Regular Employee by Industry, Size of Enterprise, and Item of Labor Cost" and "Average Monthly Cash Earnings Per Regular Employee by Industry, Size of Establishment, Status, Sex, and Item" (Japan 1978-87).

It can also be seen in columns 3 and 4 of table 2 that in Japan the average days of entitled and of acquired (that is, actually used) paid vacation rise as firm size rises. Consistent with this result, it can be seen in columns 1 and 2 that both the average number of days and of hours worked per month tend to decrease as firm size increases. This firm-size-related variation in the provision of nonwage benefits is further evidence against the validity of the consistency hypothesis.

Gender

In the research literature on female-male earnings differences, nonwage benefits are rarely mentioned. Recent textbooks on the work behavior and economic condition of women are also largely silent on the issue of nonwage benefits. Yet there is evidence of important differences in the extent to which female and male workers are covered by nonwage benefit programs.

Based on his analysis of adjusted microdata from the March 1980 CPS, Smeeding concludes that:

Considering all workers . . . , men received a higher dollar amount and a higher percent of salary in fringe benefits than did women. The ratio of female to male salary is 47.0 percent, while their [sic] ratio of fringe benefits at the employee value is only 39.5 percent (Smeeding 1983, 246).

Using microdata from the Health Insurance Study, Leibowitz (1983) takes a closer look at the female to male differences in the use of particular sorts of nonwage benefits. For full-time employees, Leibowitz finds that:

Female employees were significantly more likely to receive paid sick leave and vacation than male employees, while men were more likely to receive both accident and life insurance. Male and female workers were equally likely to receive health insurance through their employment (Leibowitz 1983, 380).

Using 1979 CPS data, Oi finds that, even after controlling for firm size, female workers are substantially less likely to be covered by a private pension program than are male workers (Oi 1983, 92-93, table 2.8).

There are even greater differences in Japan than in the United States in the extent to which female, versus male, workers are covered by nonwage benefit programs. On av-

Table 3.—Relationships Among Compensation Components, Japanese Manufacturing, 1978-85

	Dependent variable					
	Legally mandated benefits ¹			Nonmandated benefits ¹		
	(1)	(2)	(3)	(4)	(5)	(6)
Cash earnings ¹ *	-0.157 (.59)			0.357 (.60)		
Regular pay ¹		-0.494 (2.10)			0.188 (.306)	
Bonus payments ¹			-0.070 (.36)			0.648 (2.29)
Size: 500+	.371 (3.02)	.467 (5.61)	.349 (2.39)	.827 (3.23)	.924 (4.81)	.534 (2.77)
Size: 100-499 ³	.173 (2.66)	.205 (5.22)	.167 (1.77)	.257 (2.09)	.312 (3.68)	.062 (.53)
Time trend	.031 (7.64)	.035 (8.17)	.030 (6.63)	-.021 (1.76)	-.020 (1.53)	-.026 (2.67)
Constant	0.63 (7.42)	12.34 (10.21)	10.06 (13.98)	6.69 (2.09)	7.64 (2.41)	6.14 (5.73)
R ²	.916	.925	.916	.962	.961	.967

1. Monetary variables are in natural logs.
2. Cash earnings consist of regular pay plus bonus payments.
3. The size category of 30-99 was omitted.

Source: Figures are calculated using data from the Ministry of Labor (Japan 1978-87).
NOTE.—Regressions reported in columns (1) and (4) use cash earnings as an independent variable; those in columns (2) and (5) use regular pay, and those in columns (3) and (6) use bonus payments. The number of observations is 24 (which is 8 years times three size groups). Numbers in parentheses are t-ratios based on White heteroskedasticity-corrected standard errors.

erage, female workers also receive smaller portions of their total compensation in the form of bonus payments. See Nakamura and Nakamura (1988, table 2).

Interrelationships Among Components of Compensation

Another way to disprove the validity of the consistency hypothesis is to show that the interrelationships between two alternative categories of nonwage benefits and a common set of other compensation components differ systematically. This approach is adopted in this section.

Using published data for 1978-85 from annual surveys of Japanese establishments (Japan 1978-87), the logarithm of legally mandated benefits and the logarithm of nonmandated benefits⁷ were regressed separately on each of three types of compensation (total cash earnings and its regular pay and bonus payment components), on a common set of firm-size dummies, and on a time trend. (The results are reported in table 3.) Legally mandated benefits are found to be unrelated to total cash earnings, negatively related to regular pay, unrelated to bonus payments, and positively related to the time trend variable. Nonmandated benefits are found to be unrelated to total cash earnings, unrelated to regular pay, positively related to bonus payments, and negatively related to the time trend variable. Thus, benefits are not related to wage earnings by a constant fraction.

7. Legally mandated benefits consist of contributions to health insurance, pension funds, employment insurance, worker's accident compensation insurance, children allowances, seamen's insurance, employment benefits for handicapped, and obligatory compensation cost. Nonmandated benefits consist of contributions to company housing; medical and health services; food services; cultural, sporting and recreational facilities; private insurance plans; supplementary worker's accidental compensation; payments for congratulations and condolences; incentive bonus for assets formation; and other minor categories.

Conclusions

Although the wage and nonwage components of total compensation are highly correlated, we find that it is not true that nonwage benefits are related to total compensation "more or less consistently by a fraction." In fact, we have reviewed evidence that demonstrates that this fraction rises as total compensation rises, that it rises as firm size rises, and that it is higher for male workers than for female workers. However, rejecting the consistency hypothesis does not mean that information on the nonwage components of compensation is required for *all* labor supply and other sorts of analyses that, theoretically, should incorporate a measure of total compensation. In some cases, it is possible that no serious biases would result from using only wage and salary information as a measure of compensation; this point can only be demonstrated empirically for specific applications, however, if the data containing nonwage information, as well as wage information, on compensation are available.⁸

However, for many applications, such as studies of the *nature* of the female to male difference in compensation or of interindustry or intercountry differences in compensation, information on nonwage benefits is crucial. Moreover, we have reviewed evidence that suggests that the importance of nonwage benefits in total compensation probably differs depending on the characteristics of *both* the workers and the firms that employ them. Unfortunately, worker characteristics are not usually collected in surveys of firms, and firm (or employer) information is not usually collected in household surveys.

We join with Smeeding (1983), David (1983), Leibowitz (1983), and Atrostic (1983) in supporting Smith and Ehrenberg's recommendation that "employer based data sets [like the one discussed in Wood's paper] should either include measures of average employee characteristics directly, or they should contain sufficient identification so that they can be cross-referenced to employee based data sets" (Smith and Ehrenberg 1983, 364). Such a development would have implications for research on employment, on work behavior, and on the distribution of income that would reach far beyond the topic areas touched on in this comment.⁹

References

- Atrostic, B.K. (1982), "The Demand for Leisure and Nonpecuniary Job Characteristics," *American Economic Review* 72 (1982): 428-440.
- Atrostic, B.K. (1983), "Comment," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University

- of Chicago Press, for the National Bureau of Economic Research, 1983: 389-394.
- David, M. (1983), "Comment," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 278-285.
- Fleisher, B.M., and T.J. Kniesner (1980), *Labor Economics*, 2nd edition, Englewood Cliffs, NJ: Prentice-Hall.
- Japan (1978-87), *Rodo Tokei Yoran* (Summary of Labor Statistics) for 1976-85, 10 books, Ministry of Labor, Tokyo: Ministry of Finance Printing Office.
- Leibowitz, A. (1983), "Fringe Benefits in Employee Compensation," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 371-389
- Nakamura, A., and M. Nakamura (1988), "Risk Behavior and the Determinants of Bonus Versus Regular Pay in Japan," Working Paper, Faculty of Business, University of Alberta, April 1988.
- Nathan, F. (1987) "Analyzing Employers' Costs for Wages, Salaries, and Benefits," *Monthly Labor Review* (October 1987): 3-11.
- Oi, W.Y. (1983), "The Fixed Employment Costs of Specialized Labor," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 63-122.
- Orcutt, G.H., S. Caldwell, and R. Wertheimer II (1976), *Policy Exploration Through Microanalytic Simulation*, Washington, DC: Urban Institute.
- Orcutt, G.H., M. Greenberger, J. Korbelt, and A. Rivlin (1961), *Microanalysis of Socioeconomic Systems: A Simulation Study*, New York: Harper & Brothers.
- Orcutt, G.H., A. Nakamura, and M. Nakamura (1980), "Poverty Research on Family Determination of Labor Income," *Poverty and Public Policy: An Evaluation of Social Science Research*, Edited by V.T. Covello, Cambridge, MA: Schenkman Publishing Co., National Academy of Sciences.
- Smeeding, T.M. (1983), "The Size Distribution of Wage and Nonwage Compensation: Employer Cost versus Employee Value," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 237-277.
- Smith, R.S., and R.G. Ehrenberg (1983), "Estimating Wage-Fringe Trade-Offs: Some Data Problems," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 347-367.
- Triplett, J.E. (1983), "Introduction: An Essay on Labor Cost," *The Measurement of Labor Cost*, Edited by J.E. Triplett, Chicago: University of Chicago Press, for the National Bureau of Economic Research, 1983: 1-60.
- Wood, G.D. (1988), "A New Measure of the Cost of Compensation Components," *SURVEY OF CURRENT BUSINESS* 68 (November 1988): 38-43.

8. See David (1983, 284-285).

9. For further discussion of this point, see Orcutt, Nakamura, and Nakamura (1980).