E C O N O M I C S B U L L E T I N

Satisfaction and Comparison Income in Japan: evidence from data of Japanese union workers

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Abstract

This paper presents preliminary results of empirical tests for Japanese union workers on a relative utility hypothesis, along the line developed by Clark and Oswald (1996). While our results support the existence of relative utility among Japanese union workers, a caveat is presented. We argue that the traditional approach in constructing a measure of relative income might be inappropriate, at least with regard to Japanese union workers.

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1. Introduction

This paper presents preliminary results of empirical tests for Japanese union workers on a relative utility hypothesis, along the line developed by Clark and Oswald (1996). Although the literature is now "one of the most stimulating new developments in economics" (Frey and Stutzer; 2003), empirical results from Japan have been scarce, possibly because of too little communication among Japanese economists, sociologists and psychologists. We examine the relative utility hypothesis with survey data of 97,065 Japanese union workers. Those data were gathered by psychologists and are new to economists. Whereas our results fundamentally support the existence of relative concern among Japanese union workers, a caveat will be presented to the way in which previous studies of the literature were adopted in constructing relative income terms.

Among economists, economic agents are known to derive utility through comparing themselves to others. This is a hypothesis of relative utility (status preference). We can find related discussions in classics of economics such as Smith (1976), Hume (1978) and Veblen (1922). Deusenberry (1949) is an influential article in the literature to which recent economists of relative utility often refer.

In addition to theoretical studies,[1] empirical results related to relative utility have been accumulated since the seminal work of Easterlin (1974). In empirical analyses, economic agents are assumed to be concerned about relative income as well as absolute income; survey information (reported subjective well-being; SWB) is inferred to be a proxy of *utility*, the dependent variable. Although "economists [are] leery of what purport to be measures of individual utility" (Freeman; 1978), now there seems to be a consensus among researchers that (i)"SWB is a meaningful concept" (McBride; 2001) as a measure for *utility*, and (ii) "the concept of utility as subjective well-being is ... measurable from survey information with sufficient precision" (Hollander; 2001).[2]

In precedent empirical studies, attention is devoted to two types of relative utility: the utility derived by comparison with oneself and that derived through comparison with others. Analyses that have explored the former issue are motivated by the Easterlin hypothesis – that raising the incomes of all will not increase the happiness of all. Those analyses seek to explain a stylized fact that SWB has not risen for three decades despite high economic

[1] See, for example, Cole, Mailath and Postlewaite (1992; 1995).

[2] The validity of SWB is originally discussed among sociologists and psychologists. See, for excellent surveys of related topics in sociology and psychology and application to economics, Clark and Oswald (1996) and Alesina, Di Tella and MacCulloch (2004).

growth. Studies of this branch of inquiry include Easterlin (1974; 1995), McBride (2001), and Blanchflower and Oswald (2004). On the other hand, research on the latter issue includes studies by Clark and Oswald (1996), Clark (1997), Sloane and Williams (2000), Lydon and Chevalier (2002) and Brown and Mcintosh (2003). Those studies regress various types of variables, which are assumed to be arguments in utility functions, on SWB. Generally, they support the relative utility hypothesis.[3]

Our preliminary results presented in this note suggest that the difference between one's actual income from a measure of comparative income will be significantly positively correlated with SWB at work. Hence, our outcome will support the relative utility hypothesis for Japanese union workers. Our results, however, will also present a caveat.

In investigating the relative utility hypothesis, it is crucial how we construct relative income terms. One dominant approach has been to obtain a measure of comparative income from a variant of the Mincer wage equation. This procedure has been criticized because it is implausible that "individuals forecast wages in a similar way as econometricians do" (Lydon and Chevalier; 2002). Sloane and Williams (2000) and Manski (1993) make similar points. Indeed, our results show that, using data from the Japanese labor market, the predicted income terms derived by Mincer wage equations do not provide expected outcomes. Rather, differences between one's actual income from this 'comparison income' are found to be negatively and significantly correlated with SWB. Against this discouraging result, we find that when survey data of incomes are used as a measure for reference income, we can obtain results that support the relative utility hypothesis.

This paper is organized as follows. The next section gives an explanation of our new data. The third section presents preliminary results of our test on the relative utility hypothesis. The last section includes discussion related to directions of our full analyses.

2. The data

Our data set comprises survey data on 97,065 Japanese union workers. Examinees are union members of Japanese firms listed on the Tokyo Security Market. The International Economy and Work Research Institute collected the data during 1990–2004. The data set is called the Comprehensive Survey of Labor Union Members (CSLUM). Questions in the survey are designed by

[3]Typical variables included in the regression are age, sex, education experiences, and work hours. See, for surveys of *happiness studies* including studies of the relative utility hypothesis, Oswald (1997) and Frey and Stutzer (2002).

Japanese psychologists. The responses to those questions constitute the data set. It is noteworthy that because examinees are all union members, sample selection biases might be serious: we have no information of unemployed persons and those in management positions. To collect their information is a task for our future study.

Each examinee is required to indicate a subjective level of happiness at work (SWB), a level of income, *an expectation level of income of a reference group*, traditional human capital variables (age, sex, educational experiences, and job tenure), and varieties of questions with regard to conditions at work. Among those items, the first three are category data: the level of job satisfaction is a quintile, whereas the income items have nine classes. The item of expectation level of income of a reference group is crucial to our study. This item answers the question, "What do you think is the average wage of union members who are your age, doing the same job, but belonging to other companies?". We call this reference income, this answer to this survey question, the subjective reference income (SRI). Those estimated using Mincer type wage equations are called traditional reference incomes (TRIs). Underpinning the way in which SRI is constructed is the presumption among Japanese psychologists that income differences within a firm (or in an industry) are known to be quite small. For that reason, comparison with co-workers at the office might not hold much importance among Japanese laborers. With regard to the TRI, we can construct various types of comparison income by changing the subsets in which wage equations are estimated.

We will present a brief summary of our data here. More detailed explanations and discussions will be given in our full paper. The SWB is a quintile, meaning that one represents the lowest level of happiness and that five represents the highest. Table 1 states that (i) the mean of SWB exhibits a weak increasing trend between 1990 and 2004 and that (ii) Japanese laborers are not as content as British workers.[4] Of those, (i) might seem puzzling, especially for Japanese economists because the 1990s are known as the "lost decade" in Japan. Next, we present Table 2, which provides the distribution of SWB for each income class. As the table shows, the SWB of Japanese laborers increases steadily as they ascend the income ladder. This upward trend exhibits a sharp contrast to data of British workers provided by Clark and Oswald (1996), but seems to be consistent with happiness data given by Alesina et al. (2004).

Income items are of nine classes. The lowest category, 1, signifies an annual income under two million yen. From the second to the eighth category,

[4]Clark and Oswald (1996) report that the mode of SWB from data of British workers is the highest value in the SWB scale.

annual income classifications are incremented by one million yen units: the highest category, 9, represents annual income over ten million yen. Table 3 presents the distribution of our SRI for each income category. As that table illustrates, a person of a certain income class tends to expect a corresponding person in a different company to earn a similar annual income.

Table 4 portrays distributions of education and age. Educational attainment is divided into seven categories: (1) junior high school, (2) high school, (3) technical school, (4) two-year college, (5) college, (6) graduate college, and (7) other. In addition, our data are of union workers. Therefore, the number of samples decreases as the age category increases.

3. Empirical tests of the relative utility hypothesis

This section presents our preliminary results. The relative utility hypothesis is examined using an ordered logit regression of the form:

$$\text{SWB at work}^k = const^k + \alpha^k y + \beta^k (y - y') + \gamma^k h + \delta^k i + \eta^k + \epsilon^k. \quad (1)$$

In that equation, y, y', h, and i respectively represent the logarithm of annual income, the logarithm of comparison annual income (TRI or SRI), the logarithm of hours of overtime work, and the vector of individual parameters (age, square of age, sex, tenure, square of tenure, education attainment, and occupation). Before we take the logarithm, we translate income variables of categories 2–8 into corresponding median values in the scale. We set income 1 as 1.5 million yen and income 9 as 10.5 million yen; η is a year dummy and ϵ is an i.i.d. error term. Superscript k denotes the subsets ($k \in \{1 : \text{total}, 2 : \text{male}, 3 : \text{female}\}$).

3.1 Estimating TRIs

Before proceeding, we must construct the TRI from the Mincer-type wage equation. This analysis uses three TRIs. In constructing the first TRI (TRI1), we control the wage equation with industry. For the second TRI (TRI2), we control with the company. Finally, we control neither the industry nor the company. Thereby, we construct the third TRI (TRI3). Among Japanese social scientists, income differences within a company or an industry, if any, are known to be very small in Japan when age, tenure, education and occupation are examined. It is not possible, however, to deny in advance the possibility that Japanese laborers are concerned about very small

income differences from their associates' income. Hence, we will try all TRIs in estimations (1).[5] Our SRI is almost the subjective equivalent of TRI3. Unfortunately, we have no survey data corresponding to TRI1 and TRI2. Tables 5 through 7 report results of TRI estimations.

3.2 Preliminary Results

The expected sign of the term $y - y'$ in eq.(1) from the relative utility hypothesis is plus. Tables 8 through 10 report our results when the comparison income is derived from Mincer wage equations. Table 11 represents the case in which we use SRI for the reference income. With reference to the tables, we can summarize our preliminary results as follows.

First, all the signs of the comparison income terms, when we use TRIs, are minus rather than plus. They are statistically significant, except for the female samples with TRI2. On the other hand, when we consider the reference income by SRI, Table 11 shows that the data strongly support the relative utility hypothesis. From these outcomes and the presumption that our SRI will be a direct measure of the reference income in the Japanese labor market, we can suggest that the relative utility hypothesis will hold in the Japanese labor market, but also that the criticism by Lydon and Chevalier (2002), Sloane and Williams (2000) and Manski (1993) strongly applies. Individuals do not seem to forecast reference income similarly to econometricians. This deduction is robust because outcomes remain unchanged even when we change the reference group of a person from personal associates (or persons in the same industry) to the market as a whole (TRI3).

The significance of $y - y'$ in Tables 8 – 10 implies that our TRIs should reflect something that has an effect on utility. The tables indicate that SWB increases when y' increases; we might conjecture that TRIs reflect average working conditions in the industry, company, and the market as a whole. When average working conditions improve (holding one's income constant), Japanese laborers might expect that the improvement will bring them positive feedback; for that reason, the utility increases by this expectation.

Secondly, we can obtain familiar results in the literature with Japanese data. Absolute income affects utility positively and working hours negatively. Females are happier at work than males. A significant U-shaped relationship exists between SWB and age. Finally, results also reveal that job tenure brings increasing positive effects on the SWB.

[5] Controlling with an industry or company means that a person is assumed to make an income comparison within the industry or the company. One is assumed to be concerned about the expected income coming from the market as a whole when we use TRI3.

4. Directions of full analyses

In this paper, we have concentrated our attention to the relative utility hypothesis and validity of TRIs, but the literature of happiness studies is vast. Numerous promising directions of future research can be explored using these new data.

Investigation of effects of the unemployment rate on SWB is a good example because Japan experienced an unprecedented increase in the unemployment rate through the 1990s. Curiously, we find that the unemployment rate affects SWB at work positively with our data. This effect, however, diminished when the unemployment rate increased sharply in the late 1990s. The second example is a well-known examination of wage discrimination in Japan.[6] We report here briefly that Japanese male union workers feel reluctant to acknowledge wage discrimination, whereas female workers remain unconcerned about their income relative to males. This seems puzzling, but we argue that it might reflect the good morale of Japanese males. More detailed analyses and discussion related to the effects of education, experience, and sex on SWB will be given in the full paper. We argue that these effects are explainable using the "aspiration hypothesis" given by Clark (1997). Robustness of our results will be checked by replacing the present SWB (which indicates happiness at work) with happiness of overall life. Finally, to extract policy implications, marginal effects are investigated. All of those analyses are presented in our full paper.

[6] See, for a striking figure indicating wage discrimination in Japanese labor market, Blau and Kahn (2001).

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Table 1: SWB at work

	SWB mean (time series)			
year	total	male	female	# of obs.
1990	2.88	2.90	2.86	10,708
1991	3.03	3.07	2.96	4,811
1992	3.06	3.07	3.01	3,696
1993	3.08	3.17	2.96	349
1994	3.00	3.02	2.96	4,853
1995	3.15	3.17	3.04	1,772
1996	3.08	3.08	3.05	2,506
1997	3.06	3.07	3.01	1,520
1998	3.10	3.10	3.12	8,777
1999	3.20	3.25	2.99	1,361
2000	3.16	3.16	3.17	4,291
2001	3.03	3.03	3.06	8,274
2002	3.12	3.12	3.08	20,669
2003	3.05	3.08	2.95	12,995
2004	3.16	3.17	3.11	10,483
overall	3.07	3.08	3.01	97,065

SWB distribution (whole period)						
	1	2	3	4	5	mean
total	7.0%	15.0%	46.6%	27.1%	4.3%	3.07
male	7.0%	14.5%	46.1%	27.9%	4.5%	3.08
female	7.0%	16.6%	48.4%	24.4%	3.5%	3.01

Table 2: Distribution of SWB for each income class (whole period)

	SWB						
Income	1	2	3	4	5	mean	# of obs.
1	10.6%	16.3%	50.4%	18.2%	4.6%	2.90	2,313
2	9.8%	17.2%	48.3%	20.5%	4.1%	2.92	11,643
3	9.2%	16.7%	46.0%	23.8%	4.4%	2.97	16,309
4	7.9%	15.6%	46.1%	25.8%	4.6%	3.03	15,961
5	6.5%	15.1%	47.3%	27.0%	4.0%	3.07	17,226
6	5.2%	14.1%	46.8%	29.6%	4.3%	3.14	12,822
7	4.8%	12.9%	46.5%	31.9%	4.0%	3.17	10,119
8	3.3%	11.7%	45.4%	35.1%	4.6%	3.26	8,966
9	4.3%	11.3%	38.9%	41.0%	4.5%	3.30	1,706
# of obs.	6,798	14,543	45,252	26,326	4,146		97,065

Table 3: Distribution of SRI for each income class (whole period)

	SRI									
income	1	2	3	4	5	6	7	8	9	# of obs.
1	39.9%	45.0%	10.4%	1.9%	0.9%	0.6%	0.4%	0.5%	0.6%	2313
2	2.3%	49.3%	38.4%	7.3%	1.8%	0.4%	0.2%	0.1%	0.2%	11643
3	0.3%	6.8%	47.6%	32.9%	9.2%	1.8%	0.6%	0.3%	0.3%	16309
4	0.2%	1.2%	11.3%	34.1%	36.3%	12.1%	3.0%	1.4%	0.4%	15961
5	0.2%	0.3%	2.9%	11.6%	32.0%	32.2%	14.8%	5.1%	0.7%	17226
6	0.2%	0.2%	1.2%	3.5%	16.3%	28.4%	29.7%	18.1%	2.4%	12822
7	0.1%	0.2%	0.7%	1.3%	8.3%	18.4%	27.6%	37.4%	6.0%	10119
8	0.1%	0.2%	0.6%	0.6%	3.8%	9.7%	19.8%	44.8%	20.4%	8966
9	0.4%	0.1%	0.6%	0.5%	1.5%	5.2%	11.7%	32.9%	47.0%	1706

Table 4: Distribution of education and age

age	male	female	total
∼29	29.5%	58.9%	36.2%
30∼39	37.1%	25.0%	34.4%
40∼49	20.1%	11.1%	18.1%
50∼	13.3%	4.9%	11.4%
# of obs.	75024	22041	97065

education	male	female	total
1	7.5%	5.2%	6.9%
2	46.1%	44.8%	45.8%
3	2.2%	3.0%	2.4%
4	4.1%	28.9%	9.8%
5	31.0%	15.2%	27.4%
6	8.2%	1.3%	6.6%
7	1.0%	1.7%	1.1%
# of obs.	75024	22041	97065

Table 5: Estimation of TRI1

	k=1	k=2	k=3
age	0.070	0.085	0.039
	(59.11)***	(69.97)***	(11.64)***
agesq	−0.001	−0.001	−0.000
	(47.80)***	(57.27)***	(9.65)***
tenu	0.023	0.021	0.030
	(38.37)***	(34.14)***	(17.15)***
tenusq	−0.000	−0.000	−0.000
	(23.63)***	(21.65)***	(8.78)***
female	−0.251	0.000	0.000
	(106.30)***		
log overtime work	0.041	0.041	0.040
	(44.11)***	(41.79)***	(16.23)***
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
industry dummies (34)	Yes	Yes	Yes
company dummies (104)	No	No	No
year dummies (14)	Yes	Yes	Yes
Constant	13.056	12.732	13.428
	(551.55)***	(498.48)***	(223.99)***
Observations	97065	75024	22041
R-squared	0.76	0.72	0.63

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Estimation of TRI2

	k=1	k=2	k=3
age	0.070	0.085	0.042
	(57.86)***	(67.56)***	(12.44)***
agesq	−0.001	−0.001	−0.000
	(46.78)***	(55.12)***	(10.53)***
tenu	0.023	0.020	0.029
	(36.32)***	(31.76)***	(16.32)***
tenusq	−0.000	−0.000	−0.000
	(20.88)***	(19.02)***	(7.59)***
female	−0.240	0.000	0.000
	(98.80)***		
log overtime work	0.035	0.032	0.047
	(37.84)***	(32.61)***	(18.70)***
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
industry dummies (34)	No	No	No
company dummies (104)	No	No	No
year dummies (14)	Yes	Yes	Yes
Constant	13.238	12.933	13.439
	(619.22)***	(559.29)***	(250.97)***
Observations	97065	75024	22041
R-squared	0.73	0.69	0.59

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Estimation of TRI3

	k=1	k=2	k=3
age	0.070	0.086	0.038
	(61.40)***	(73.11)***	(11.95)***
agesq	−0.001	−0.001	−0.000
	(49.89)***	(60.44)***	(9.78)***
tenu	0.023	0.021	0.029
	(38.88)***	(34.47)***	(17.25)***
tenusq	−0.000	−0.000	−0.000
	(24.17)***	(21.60)***	(9.82)***
female	−0.252	0.000	0.000
	(107.96)***		
log overtime work	0.045	0.046	0.043
	(48.03)***	(45.80)***	(17.39)***
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
industry dummies (34)	No	No	No
company dummies (104)	Yes	Yes	Yes
year dummies (14)	Yes	Yes	Yes
Constant	13.765	13.464	13.976
	(395.70)***	(368.19)***	(155.02)***
Observations	97065	75024	22041
R-squared	0.77	0.74	0.65

Robust t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: SWB regression with TRI1

	k=1	k=2	k=3
log(income)	3.037	2.740	2.079
	(9.07)***	(7.78)***	(2.72)***
log(income / reference income)	−2.655	−2.213	−1.997
	(7.90)***	(6.26)***	(2.61)***
log(overtime work)	−0.152	−0.139	−0.115
	(9.36)***	(8.03)***	(3.08)***
age	−0.174	−0.196	−0.065
	(7.02)***	(6.24)***	(1.80)*
agesq	0.002	0.002	0.001
	(7.23)***	(6.40)***	(2.24)**
tenu	−0.089	−0.078	−0.065
	(9.95)***	(8.91)***	(2.55)**
tenusq	0.001	0.001	0.001
	(9.68)***	(9.03)***	(1.76)*
female	0.765		
	(8.94)***		
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
year dummies (14)	Yes	Yes	Yes
industry dummies (20)	Yes	Yes	Yes
Observations	97065	75024	22041
Pseudo R2	0.01	0.01	0.01
Log likelihood	−126194.20	−97776.15	−28277.49

Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: SWB regression with TRI2

	k=1	k=2	k=3
log(income)	0.982	1.033	0.320
	(9.00)***	(8.89)***	(1.34)
log(income / reference income)	−0.624	−0.531	−0.240
	(5.52)***	(4.37)***	(0.98)
log(overtime work)	−0.066	−0.067	−0.041
	(7.07)***	(6.59)***	(1.90)*
age	−0.031	−0.051	0.004
	(2.73)***	(3.72)***	(0.17)
agesq	0.000	0.001	0.000
	(3.22)***	(3.98)***	(0.69)
tenu	−0.041	−0.042	−0.012
	(8.18)***	(7.98)***	(0.91)
tenusq	0.001	0.001	0.000
	(7.18)***	(7.51)***	(0.11)
female	0.251		
	(7.71)***		
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
year dummies (14)	Yes	Yes	Yes
industry dummies (20)	Yes	Yes	Yes
Observations	97065	75024	22041
Pseudo R2	0.01	0.01	0.01
Log likelihood	−126210.21	−97786.16	−28280.40

Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: SWB regression with TRI3

	k=1	k=2	k=3
log(income)	5.582	4.540	2.898
	(8.51)***	(7.10)***	(2.69)***
log(income / reference income)	−5.200	−4.013	−2.815
	(7.90)***	(6.26)***	(2.61)***
log(overtime work)	−0.224	−0.175	−0.167
	(9.12)***	(7.81)***	(3.01)***
age	−0.354	−0.351	−0.107
	(7.56)***	(6.32)***	(2.13)**
agesq	0.004	0.004	0.001
	(7.72)***	(6.45)***	(2.48)**
tenu	−0.145	−0.113	−0.087
	(9.33)***	(8.20)***	(2.61)***
tenusq	0.002	0.002	0.001
	(9.64)***	(8.75)***	(1.97)**
female	1.345		
	(8.52)***		
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
year dummies (14)	Yes	Yes	Yes
industry dummies (20)	Yes	Yes	Yes
Observations	97065	75024	22041
Pseudo R2	0.01	0.01	0.01
Log likelihood	−126194.20	−97776.15	−28277.49

Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: SWB regression with SRI

	k=1	k=2	k=3
log(income)	0.204	0.315	−0.033
	(7.25)***	(9.34)***	(0.60)
log(income / reference income)	0.523	0.568	0.352
	(19.46)***	(17.94)***	(6.79)***
log(overtime work)	−0.041	−0.047	−0.030
	(5.66)***	(5.81)***	(1.72)*
age	0.021	0.003	0.022
	(2.72)***	(0.39)	(1.17)
agesq	−0.000	0.000	0.000
	(0.70)	(0.99)	(0.12)
tenu	−0.028	−0.032	−0.008
	(7.40)***	(7.55)***	(0.85)
tenusq	0.001	0.001	0.000
	(6.42)***	(6.86)***	(0.11)
female	0.065		
	(3.68)***		
education dummies (6)	Yes	Yes	Yes
occupation dummies (3)	Yes	Yes	Yes
year dummies (14)	Yes	Yes	Yes
industry dummies (20)	Yes	Yes	Yes
Observations	117125	91041	26084
Pseudo R2	0.01	0.01	0.01
Log likelihood	−152593.65	−118901.45	−33533.62

Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%