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HOW'S THE JOB?
WELL-BEING AND SOCIAL CAPITAL IN THE WORKPLACE

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ABSTRACT

This paper takes a different tack in addressing one of the fundamental questions in economics: what are the factors that determine the distribution of jobs and wages? In Adam Smith's classic formulation, and in much of the subsequent literature, wage levels have been used to estimate the values of job characteristics ("compensating" or "equalizing" differentials). There are econometric problems with this approach, principally caused by unmeasured differences in talents and aptitudes that enable people of high ability to have jobs with both high wages and good working conditions, thus understating the value of working conditions. We bypass this difficulty by estimating the extent to which incomes and job characteristics influence direct measures of life satisfaction from three large and recent Canadian surveys.

The well-being results show strikingly large values for non-financial job characteristics, especially workplace trust and other measures of the quality of workplace social capital. The compensating differentials estimated for the quality of workplace social capital are so large as to suggest that they do not reflect a full equilibrium. Thus the current situation probably reflects the existence of unrecognized opportunities for managers and employees to alter workplace environments, or for workers to change jobs, so as to increase both life satisfaction and workplace efficiency.

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1. Introduction

Adam Smith hypothesized that five factors serve to explain why some jobs are paid more than others: "First, the agreeableness or disagreeableness of the employments themselves; Secondly, the easiness and cheapness, or the difficulty and expense, of learning them; Thirdly, the constancy or inconstancy of employment in them; Fourthly, the small or great trust that must be reposed in those who exercise them; and, fifthly, probability or improbability of success in them"(Smith 1850, 45- Part I of Chapter 10 of Book 1). He argued that, in the absence of policy or other impediments to mobility, wages would tend to adjust so as to be the same for all jobs of equivalent characteristics, so that these wage differences would reflect the relative attractiveness of different employments. This analysis lies behind much of modern labour economics.

The first factor underlies attempts to establish the value of life as reflected in wages for jobs of differing physical risks, to establish the amenity value of jobs and hence life in different locations, and to assess the value of different job characteristics, mainly disagreeable rather than agreeable features. This factor will be our main focus of attention in this paper, although our methodology differs from previous studies, since we do not estimate compensating differentials by comparing different assumed market equilibria (as is implied by the usual equations using wages at the dependent variable). Instead, we calculate the income-equivalents of different job characteristics by comparing the effects of income and job characteristics as factors influencing life satisfaction.

2. Alternative Approaches

There have been many previous attempts to value non-financial aspects of jobs using wages or incomes as the dependent variable. In his survey of estimates of compensating wage variations for risk of injury or death, Viscusi (1993) notes that industry-average data were used before large samples of individual data became available in the final decades of the 20th century. He argues that individual-level data are likely to be superior, not just because of the larger sample sizes, but because worker tastes and attributes, as well as unspecified aspects of jobs, are likely to vary across industries in ways that may be correlated with accident risks. For cross-sectional studies using individual wage or

earnings data to estimate compensating differentials, there are other estimation problems. The most obvious is that posed by unmeasured differences in employee ability and training. More able or better-trained workers are in a position to choose jobs that produce more income and more safety, making the usual assumption that safety is a normal good. The most usual estimation form is:

(1) $\ln(y_i) = \alpha + \beta X_i + \gamma Z_i + \theta Zu_i + \varepsilon_i$

where y_i is the earnings level for worker i, X_i is a vector of job characteristics, applicable to worker i's job, whose compensating differentials are to be estimated by the coefficient vector β, the Z_i are measured characteristics of worker i, and the Zu_i are unmeasured characteristics of the worker, the job, or the market environment in which the wage is being paid. The ε_i are the assumed error structure, usually taken to be normal.

Returning to the issue posed by un-measured differences in ability, suppose that the worker's level of training is included among the Z variables, but that his or her native ability, or personal suitability for the job at hand, is unmeasured, and hence among the Zu variables, which are not included in the regression. Suppose also that the safety of the job is included among the X variables. The usual theoretical presumption is that safety is a normal good, so that workers possessing higher than average abilities will use their extra bargaining power to obtain jobs that are both safer and more highly paid. In the absence of a variable measuring ability, this result would lead to an upward bias on the coefficient measuring the effects of education (assuming ability and education to be positive correlated) and a bias towards zero on the coefficients of variables measuring job safety. In the absence of variables measuring worker education and training, it is presumed that the downward bias in the estimation of the compensating variation for safety would be even greater.

Data from one of the surveys used in this paper help to illustrate the reality of this problem, and show also that attempts to remove the bias in the estimation of compensating differentials by allowing for the effects of education on income are likely to be insufficient. In the ESC survey, for example, working respondents are asked to

measure the extent to which their jobs possess five job characteristics and one workplace characteristic that are presumed (and subsequently found) to have a positive influence on job satisfaction, independent of the level of income. Each respondent is asked whether their job: allows them to make a lot of decisions on their own, requires a high level of skill, has a variety of tasks, provides enough time to get the job done, and is free of conflicting demands. These answers are on a four-point scale, converted to a 0 to 1 scale for the analysis presented below. Respondents are also asked, this time on a scale of 1 to 10, to rate the level of trust that workers have in management at their workplace. Of these six factors, three have positive correlations with income (decision scope, skill and variety, while the other three have negative correlations. This pattern holds whether the correlations with income are measured individually or jointly, and occur whether or not the substantial effects of education on income are allowed for in the way depicted by equation 1[1].

To further investigate whether the confounding effects of omitted ability differences among workers were responsible for this type of result, Brown (1980) developed a panel data set and then estimated compensating differentials with and without using fixed effects for each individual, although thereby forcing the estimates of compensating differentials to be based solely on job changes, which he found to be fairly frequent in his sample. The use of individual fixed effects should have eliminated the problem caused by stable interpersonal differences in ability, but he found only slight changes in the results. Thus while omitted ability may be part of the story, it is not the only reason for earlier failures to find plausible estimates of equalizing differentials.

More recently, Lang and Majumdar (2004) have developed a theoretical job search model involving jobs with both pecuniary and non-pecuniary aspects, and used it to show that in the presence of plausible frictions the resulting equilibrium allocation of workers to jobs can easily be expected to produce a cross-sectional positive correlation between income and (favourable) non-pecuniary job characteristics, even if workers are homogeneous.

[1] If a version of equation 1 is estimated using all six job characteristics and three education level variables, the sign patterns are as described in the text, and of the 'correctly' (negatively) signed job characteristics, only the workplace trust variable is significant. See the Appendix for details.

Despite these difficulties, there has been a range of Canadian studies producing large and statistically significant estimates of compensating differentials for job-related injuries and fatalities. Gunderson and Hyatt (2001) compare a number of these results, and extend the model set in two ways. The first is to allow for the possibility mentioned above, that since safety is likely to be a normal good, that workers of above-average abilities (or who for some other reason have higher incomes) will use some of their potential income to obtain safer jobs (Viscusi 1993). In the absence of correction, this would lead to an under-estimation of the wage payment required to compensate for increased danger. Gunderson and Hyatt adjust for this possibility by estimating a separate equation for the risks in each workplace, and using the fitted values as instruments. This gives a significantly higher estimate for the compensating differential for risk of death.

The second adjustment relates specifically to risk tolerance, with workers who either prefer or are better able to minimize risks, in ways that are not possible to measure, sorting themselves into the riskier jobs (their 'self-selection model'), providing an additional reason why the basic model might under-estimate the size of the compensating differential. This would render the previously estimated risk equations insufficiently protective against bias; using a corrective procedure suggested by Garen (1988), Gunderson and Hyatt (2001) found it made little difference to their key results. However, when they added industry controls (reasonably enough) to the risk equation, which left the identification of the risk equation to depend solely on the risk experience rating variables, the value of a fatal injury rose still further.

Yet another difficulty with the direct estimation approach was raised by Dickens (1984), who argued that safety issues might be embodied in the wage bargaining in unionized sectors, with the estimated results more reflective of differences in union bargains than in individual worker preferences. This possibility is supported by the results of Cousineau, Lacroix and Girard (1992), who find, using what Gunderson and Hyatt (2001) refer to as the 'basic model', that the risk of fatal injuries takes a large and significant value in their sample of union workers, but drops out entirely in their sample of non-union workers.

Testing for a union interaction term with the risk variable, Gunderson and Hyatt (2001) do not find a parallel effect in their much smaller sample, and neither did Meng (1989).

The econometric difficulties posed by using wage equations to identify compensating differentials, along with equivalently anomalous results from our survey data on incomes and job characteristics, suggests that it might be more promising to use subjective well-being data as a means of estimating and comparing the well-being effects of income and job characteristics.

3. Using Life Satisfaction Data to Value Job Characteristics

In this section we use life satisfaction and job characteristics data from three large recent Canadian surveys to extend research in several dimensions. Our primary objective is to estimate compensating differentials directly from a representative utility function. In this framework, estimates of compensating differentials are provided by the ratios of the marginal effects of job characteristics to those of income. Second, we link our results to the emerging literature on the effects of social capital on life satisfaction, showing that workplace trust and other aspects of life in the workplace have strong effects on life satisfaction. Third, we test the robustness of our results by using data from three separate recent surveys, by checking that our key results are unaffected by the inclusion of individual-level personality variables, by excluding different clusters of unusual observations, and by including a number of variables chosen to reduce the possibility that our final estimates for compensating differentials are too high. Fourth, we compare the direct effects of job characteristics on life satisfaction with those flowing indirectly via their influence on job satisfaction.

The three survey sources include the second wave of the SSHRC-supported ESC survey (described in more detail in Soroka et al 2005) and two Statistics Canada surveys: the 2002 post-censal Ethnic Diversity Survey (EDS), and the 2003 General Social Survey(GSS). The scope and contents of the two latter surveys are described in detail on the Statistics Canada website, and these data were accessed through the interuniversity Research Data Centre located at UBC. The surveys differ in their sample size and the

nature and number of questions asked. For the results reported in this paper, we generally restrict our analysis to the working population, roughly 1700 for the second wave of the ESC, 19,300 for the EDS and 9,900 for the GSS. Fortunately, the same life satisfaction question is asked in all three surveys: "In general, how satisfied are you with your life as a whole these days, on a scale of…" The preferred ten-point scale is used for responses in the ESC and GSS, while a 5-point scale was used in the EDS. For closer comparability across surveys, we have adjusted the EDS data to an approximate 10-point scale. For the survey-ordered probit regressions we use in this paper, this rescaling has no effect on the ratios of coefficients within the same equation, and it is these rations that provide the raw material for our calculation of compensating differentials. Both the ESC and the GSS asked a job satisfaction question, also on a 10-point scale. In addition, in the second wave of the ESC survey there were a number of questions relating to job characteristics, and we use these in two different ways, both to estimate a reduced-form equation in which job characteristics are used directly as part of the explanation for life satisfaction, and in the estimation of an instrumental variable for job satisfaction designed to avoid variation due to income effects, to personality, and to issues related to the framing of questions. The wording of the relevant questions is shown in the Appendix.

Finally, and helpfully, the GSS contains a series of questions designed to measure the respondent's psychological coping resources (Pearlin and Schooler 1978, 20). The 'mastery scale' thereby constructed may run the risk of over-correcting for the effects of pure personality differences, since the answers document the extent to which respondents feel they are in command of their circumstances[2]. These answers are more than likely to be affected not just by underlying personality traits, but also by the current range of problems exercising the respondent's coping skills. We allow for these possibilities in the GSS by also including other measures of domain satisfaction, so that the job satisfaction

[2] The mastery index is based on a principal component analysis of extent of agreement with the following statements: I have little control over the things that happen to me; There is really no way I can solve some of the problems I have; There is little I can do to change many of the important things in my life; I often feel helpless in dealing with the problems of life; Sometimes I feel that I'm being pushed around in life; What happens to me in the future depends mainly on me; I can do just about anything I really set my mind to do.

coefficient should reflect only the extent to which satisfaction with the job differs from the other forms included.

Equation 2 shows the basic structure of our estimating form for life satisfaction equations, which we are treating as though they were direct utility functions.

(2) $Lsatis_i = \alpha + \delta_1 \ln(y_i) + \delta_2 \ln(y_{ct}) + \beta X_i + \gamma Z_i + \theta Zu_i + \varepsilon_i$

where $Lsatis_i$ is life satisfaction for respondent i, measured on a scale of 1 to 10, y_i is the level of income of the respondent's household, y_{ct} is the average level of household income in the respondent's census tract, and the other variables are as in equation (1), except that the coefficients now measure their impact on life satisfaction rather than on wages, and the variable set is expanded to include all other determinants of life satisfaction. When we use equation (2) to estimate the value of job characteristics, we will do so by taking the ratio of a coefficient on one of the components of the job characteristic vector X to δ_1 , the coefficient on log income. This matches the functional form assumptions implicit in most previous attempts to evaluate job characteristics using wage equations. It presumes that for each worker the monetary value of a change in some job characteristic is measured as a fraction of his or her income, which in turn implies that higher-income households are prepared to give up more dollars to obtain a higher level of non-financial job satisfaction. We report later on the fit and implications of alternative functional forms; finding that this simple form performs well against more complex alternatives. In any event, all of the versions we have considered give us similar basic results.

Figure 1 shows the presumed underlying causal schematic. We try to control for as many as possible of the direct determinants of utility, so that our estimates of the effects of income and workplace characteristics should be relatively accurate, and hence useful for constructing estimates of the income-equivalent values of various elements of workplace social capital. We use survey-ordered probit estimation with errors presumed to be clustered at the level of the census tract. Although the probit and linear forms give similar results for compensating differentials, the probit form is perhaps more convincing, since it permits us to drop the cardinality assumption required for the linear form. In fact, the

computed cut-lines for the probit suggest that there is only slightly less at stake in moving across the relatively unpopulated bottom half (in the ESC working sample, more than 90% of the respondents rank their life satisfaction at 6 or above on the 10 point scale) than the top half of the life satisfaction scale.

Table 1 contains our preferred life satisfaction equations fitted separately for each of the surveys. Table 2 shows our gradual progress towards the final GSS equation contained in Table 1. The second and third columns of Table 2 are the two equations for the GSS, one with and one without allowing for individual-level personality differences, as embodied in the mastery scale. Because the previous literature has argued that the often-found positive relation between job satisfaction and life satisfaction might be due to the correlation with unmeasured personality differences (Arvey et al 1989, Heller et al 2002), it is important to note some of the key consequences of including individual-level personality variables.

The first thing to note is that personality does indeed appear to have a strong positive relation to life satisfaction, with the significance of the mastery scale coefficient being exceeded only by that of job satisfaction. This is consistent with numerous psychological studies, including those of identical twins raised together or apart, that show a large degree of heritability in happiness-determining aspects of personality. It is remarkable that the introduction of such an important variable has such modest effects on the size and significance of other coefficients, including those where personality differences have been held by sceptics to underlie some frequently observed cross-sectional correlations. For example, it has been argued that the strong positive correlation between being married and being satisfied with life exists because marriage is to a substantial degree a sorting device that enables those with outgoing and well-coping personalities to find and wed equally well-found spouses, making marriage a prize rather than a causal factor. Our results cast considerable doubt on that interpretation, as the coefficient on marriage retains its considerable size and significance when the personality variable is included.

Where there are changes in other coefficients, they appear where they might be expected. Interestingly, the previously modest negative partial effects of higher education on life satisfaction (cet. par., the simple correlation is strongly positive) become larger and more significantly negative, as one would expect to be the case if education provided students a chance to develop their latent coping skills. The inclusion of the mastery scale also sharpens the rise in subjective well-being after middle age, just as was previously found for health. Thus older age is more likely to lead to increased happiness for those who keep their physical health and self-perceived ability to cope with whatever life throws their way. The fact that the mastery scale itself has a negative correlation with age may suggest either a decline in bravado as age occurs or reflect the possibility that on average older people see themselves as having a smaller range of options for dealing with life's exigencies. The effects of income on life satisfaction are less when perceived ability to cope is included in the equation. This may be because those with better coping personalities are more able to find and hold higher-paying positions. It may also be because those who have higher incomes, for whatever reason, may feel better placed to deal with whatever comes their way.

The coefficient on non-financial job satisfaction is unchanged by the addition of the mastery scale, so that making explicit allowance for individual personality differences raises rather than lowers the estimated size of the compensating variations for job satisfaction as a whole. Since we wish our estimates of these differentials to err if anything on the conservative side (because they are likely to be thought surprisingly large), we shall base our main results, as shown in Table 1, on equations that include the mastery scale adjusted to remove its correlation with income. As shown in column 3 of Table 2, this restores the income coefficient to what it was without the inclusion of the mastery scale. This makes it easier to compare the results with those from the other surveys, since the ESC and the EDS do not have personality variables. As will be discussed later, the GSS equation in Table 1 also includes variables measuring each respondent's answers to three other domain satisfaction questions, to help eliminate any risk that the high job satisfaction answers are due to question wording and placement effects.

We turn next to consider the effects of income on life satisfaction. In our previous work (e.g. Helliwell 2003), we included dummy variables for each of several income classes, so as not to constrain the all-important functional form linking income and life satisfaction. From time to time we and others have used linear approximations (which are fairly accurate over a broad range of middle-income classes in Canada) to calculate the income equivalents of other variables entering the life satisfaction equation. For the current paper, we have done further tests, and found a preferred strategy. We were interested in testing a logarithmic form against the linear form for two main reasons, the first being to increase comparability with earlier studies. Most previous estimates of compensating differentials, based on wage equations like that shown as equation (1), have used the natural log of income as the dependent variable, with job characteristics as independent variables, and utility presumed to be constant for compensating changes. Our equation (2) also compares log income and job characteristics, but does so by including them all on the right hand side, along with other possible variables influencing utility. The size of the compensating differential is then calculated as the ratio of the selected job coefficient to that of income. Second, if a logarithmic form should prove to be empirically defensible, it introduces in a simple way the presumed non-linearities that reduce capacity to pay as incomes fall very low, and reveal declining marginal utility of consumption as incomes get large.

We have done a number of tests of log income against more general specifications, and find the log form to be an acceptable simplification. For all three surveys, an encompassing model for life satisfaction including both household income and its logarithm (r=.73 between these two variables in ESC) allows the linear income variable, but not the log form, to be excluded. The pure linear form is also dominated in all three surveys by an equation including the income class dummy variables. When log income and the income classes are tested against one another, the choice is less clear-cut. Taking account of the saving in degrees of freedom, the log form is nonetheless preferable.

Another change to our treatment of income has been to consider various measures of contextual income levels, allowing us to test absolute versus relative income models. As a starting point, we compared personal and household income as determinants of life satisfaction reported by the survey respondent (who, in our equations, was employed, and was as likely to be female as male). We found in all three surveys that household income was the stronger of the two alternative income variables in the life satisfaction equation, with personal income being stronger in the job satisfaction equation. However, ESC and EDS life satisfaction equations that include personal and household income have significant positive coefficients on both, although the household income effect is always larger as well as more significant. In the GSS life satisfaction equation, there is no significant effect from personal income. In all three surveys, household income takes a positive coefficient given the level of personal income. This positive spill-over from the incomes of other household members implies that the empathy and income-pooling effects dominate relative income effects at this closest level of aggregation, echoing the South African results of Kingdon and Knight (2004).

However, when we turn to include the log of the average household income in the census tract, the coefficient is negative and strongly significant in all three surveys, in each case being large enough to make the life satisfaction effects of household income mostly (entirely, in the case of the GSS) relative in nature. There are important implications of this result[3], and there are other contextual effects that can be assessed with our current survey data, given the large number of census tracts represented (more than 2000 in our EDS sample, for example). We include only average income here, since it is the only one that has a significant effect on the estimated size of the compensating differentials for job characteristics. Because there is a positive correlation between respondent family income and the average family income in their census tract (e.g. +.26 in the ESC, see Appendix Table 4), and since own-family income and average income take different signs in the estimated life satisfaction equations shown in Table 1, it is important to include average income in the equation to get an unbiased estimate of the family income effect. Including

[3] The negative externalities implied by the negative well-being effects of rising comparator incomes and expenditure, have been noted by economists from Veblen (1899) on, including Easterlin 1995, Frank 1997, Layard 2005 and Eaton and Eswaran 2005.

average income in the census tract raises the size and the precision of our estimates of the positive life-satisfaction effects of household income. The resulting estimates of compensating differentials are thus smaller and more precise than they would otherwise be. This fits our general strategy of wishing to err if anything on the conservative side when estimating compensating differentials.

We have discussed at some length our estimates of the effects of household and personal income on life satisfaction. To make our results as comparable as possible with those elsewhere in the literature, we shall generally use the personal income coefficients to calculate compensating differentials, since personal income is closer than household income as an indicator of the wage paid for the job under consideration. To complete our calculations of compensating differentials, we next need to develop estimates of the life satisfaction effects of workplace characteristics. The three surveys ask different questions about life in the workplace, so that some issues have to be dealt with by triangulation rather than independent parallel tests. For example, only in the GSS can we assess the likelihood that answers to workplace questions might be affected by individual-level personality differences. Only the ESC and the GSS include questions about job satisfaction, and only in the ESC is there a full set of more detailed questions about job characteristics. Fortunately, all three surveys have questions about the level of trust in the workplace, a key determinant of job satisfaction, so we can estimate the well-being effects of workplace trust for all three surveys.

Survey responses about job satisfaction and about life satisfaction reflect the possibility of two-way causation, as well as the possibility that both may be influenced by excluded variables and that both are subject to similar measurement errors. All of these risks of positive bias have been established in other studies, and we have found some evidence of each in our own samples. We want to eliminate, or even over-eliminate, each of these risks of positive bias so that our estimates of the well-being effects of job satisfaction can reasonably be thought to err on the conservative side. Three main methods are open to make such adjustments. Where we have a suitable set of variables to provide the basis for solid instrumental variables regression, then this should serve to eliminate the risks from

omitted variables, question-framing and placing issues, and two-way causality. The ESC survey provides a fairly broad set of answers to particular questions about job characteristics. These are specific enough to remove the key risks attached to the job satisfaction measure, while numerous enough to span the main determinants of job satisfaction, and hence to provide an adequate information base for instrumental variables regression.

Our two equation system for job and life satisfaction thus takes the following form:

(3) $JS_i = \alpha_j + \delta_{1j} \ln (yp_i) + \delta_{2j} \ln (y_{ct}) + \beta_j X_i + \gamma_j Z_i + \theta_j Zu_i + \varepsilon_{ji}$

(4) $LS_i = \alpha + \delta_1 \ln (y_i) + \delta_2 \ln (y_{ct}) + \beta_1 JS_i + \gamma Z_i + \theta Zu_i + \varepsilon_{li}$

These equations together suggest two alternative procedures. The first is to estimate equation (4) by instrumental variables estimation, using the predicted values from (3) in order to remove the presumed correlation between the unmeasured variables and error terms in (3) and (4), whether due to personality, question framing, or other causes. The second method is to substitute equation (3) into equation (4) and hence to estimate the reduced form for the model directly. We have followed both procedures for the ESC, and the two alternative life satisfaction equations are shown in Table 1.

For the instrumental variables regression we have also made a second adjustment to remove the effects of income entirely from our measure of job satisfaction. In doing this, a subsidiary issue arises with respect to the treatment of census-tract income. We might expect, following earlier results by Clark and Oswald (1996) and many others, that some measure of comparator incomes would have a significant negative effect on job satisfaction. We did include the census-tract income in the regression of job satisfaction in both surveys (see Appendix table 1), but CT income is statistically insignificant in either of them. We therefore ignore census tract income in the adjustment to define non-financial job satisfaction, which, in the case of the ESC, is thus:

(5) $JSn_i = \hat{\alpha}_j + \hat{\beta}_j X_i + \hat{\gamma}_j Z_i = \hat{J}S_i - \hat{\delta}_{1j} \ln(yp_i)$

The adjusted measure JSn in equation (5) is what we use for the ESC life satisfaction equations shown in Table 1. JSn is to be seen as a measure of non-financial job satisfaction. The ratio of its coefficient to that of log income thus measures the log change in household income that would provide the same life satisfaction as a one-unit change in non-financial job satisfaction.

For the GSS, we do not have specific measures of job characteristics, so we have developed a third strategy involving a series of procedures designed to remove the risks of positive bias on the job satisfaction variable. Since we have established that job satisfaction is positively related to income, and since we want to make sure that all the well-being effects of income flow through the income variable itself, we have two alternative procedures to develop a measure of non-financial job satisfaction. One is to mimic what we have done for ESC, recognizing that we have a rather limited set of instruments. Indeed, the only job-specific variable in the GSS version of equation (3) is trust in co-workers. The second alternative is simply to subtract the estimated income effects from the original survey answers to the job satisfaction question. This has the advantage of including the effects of all the additional determinants of non-financial job satisfaction, but at the expense of some possible bias caused by positive correlation between the error terms in equations (3) and (4). The first column of Table 2 embodies the first alternative, while the right-hand column of Table 1, our preferred equation, uses the second. This alternative, which uses measured job satisfaction net of the income effect, gives a better-fitting life satisfaction equation. This is to be expected, since it includes more job-related information and possibly correlated error terms. However, we find that this better-fitting equation also gives a smaller estimated income-equivalent value of job satisfaction, so it is to be preferred as part of our strategy of keeping our estimates on the low side.

However, there still remains in our GSS equations the possibility of framing effects, reverse causality or spill-over effects, and some remaining risk that variations in optimism through time and across individuals might skew answers to all satisfaction equations in ways not fully accounted for by the inclusion of the mastery scale.

Fortunately, the GSS includes other domain satisfaction questions, each of which is likely to have a direct effect on life satisfaction but also to be subject to the possible biases outlined above. We have therefore included the GSS responses to three key domain satisfaction questions, one related to health satisfaction, a second measuring satisfaction with the way that non-work time is spent, and the third measuring financial satisfaction. The financial satisfaction variable is purged of the influence of income, so as to keep all income effects flowing through the main income variable. These satisfaction questions were asked at the same place in the GSS as the life satisfaction and job satisfaction questions, and are scaled in exactly the same way. If framing effects were pervasive, then there would be substantial multi-collinearity among the domain satisfaction variables, and imprecise coefficients as a result. In fact, each of the domain satisfactions has a highly significant coefficient in the life satisfaction equation. However, including the additional domain satisfaction variables does provide extra insurance against the possibility that our job satisfaction results are driven by correlated errors, and in the process also reduces substantially the coefficient on non-financial job satisfaction. We have also undertaken experiments to ensure that our results are robust to the exclusion of groups of respondents whose answers suggest the risk of measurement error, for example, those who give nearly identical answers to all of the satisfaction questions.

The GSS life satisfaction equation in Table 1 represents our most conservative estimate of the life satisfaction effects of job satisfaction. It includes job satisfaction measured net of the Appendix Table 1 estimate of the effects of income, other non-financial domain satisfaction answers, and the effects of personality, as represented by the mastery scale, again net of income effects. This equation thus gives us, compared to the alternatives shown in Table 2, the smallest estimate of the value, expressed in log of household income, of non-financial job satisfaction. This is given by the ratio of the job satisfaction coefficient to the coefficient on the log of household income. These estimated ratios are shown in Table 4, along with their estimated standard errors. For both ESC and GSS we calculate standard errors using the delta method and the relevant parts of the parameter variance-covariance matrix. In the case of the GSS (and later the EDS) we are also able to use bootstrapping procedures designed to provide more accurate estimates of standard

errors in the context of complex survey designs. As a by-product, this permits us to calculate the standard errors for the ratios as the standard deviations of the distribution of the estimated ratios from 200 bootstrap replications, multiplied by a factor of 5[4].

The estimated compensating differentials for non-financial job satisfaction are very large in both samples. The log income value of a one-point change in job satisfaction, on a ten-point scale, is estimated to be .681 in the ESC and .704 in the GSS. Taking .500 as a fairly extreme lower bound to these two estimates, to reduce job satisfaction from 9 to 8 on the ten-point scale (a move that would cover about 10% of the ESC respondents) would, for a family with $65,000 income (about the mode for families with at least one person in full-year full-time employment), have to be matched an income increase of more than $30,000 per year. Even at the more crowded centre of the distribution of job satisfaction responses, as shown in Table 8, moving from the middle to the 75% percentile in job satisfaction would have a personal income equivalence, for someone of median income, of $17,000 per annum. These dollar amounts would be correspondingly lower for families with lower incomes, and vice versa. These results are from our preferred equations, chosen to make all available adjustments to avoid over-statement of the effect. In the case of the ESC, the equation is based on an instrument driven from specific job characteristics, while the GSS equation includes the mastery scale and three other measures of domain satisfaction. In both cases the effects of income on job satisfaction have been removed to ensure that all income effects flow through the income variable, so that the ratio should measure the income value of change in non-financial job satisfaction.

The ESC also permits us to assess the importance of specific job characteristics, and to do so in two ways. One way is simply to estimate the reduced form, so as to reveal the net effects of job characteristics on life satisfaction. The second method is to estimate the effects of job characteristics on job satisfaction, and then to calculate their effects on life satisfaction as mediated through the estimated effect of job satisfaction on life

[4] This adjustment is necessary because the GSS uses means bootstrap weights from groups of 25. On the use of bootstrapping in GSS, See Phillips (2004).

satisfaction. These two procedures (which are compared in Table 6) are not expected to give the same answers, since they are measuring interestingly different things. The biggest difference relates to the well-being consequences of having a job involving lots of decision-making. Decision-making has a significantly positive effect on job satisfaction (and hence on life satisfaction as mediated through the effect of job satisfaction in the life satisfaction equation), but in the reduced form the net effect is insignificantly negative, as shown in Tables 4 and 6. Thus the gains on the job are offset by losses on the home front. The reverse is true for the skill, variety, time available and freedom from conflicting demands, all of which have greater effects in the reduced-form life satisfaction equation than where their impact is limited to that flowing through job satisfaction. This suggests positive spillovers from these job characteristics, in contrast to the negative ones from decision-making.

These results suggest some re-interpretation of the famous Whitehall study (Marmot et al 1991) showing that those at the higher levels in the UK civil service have better health outcomes. This result has been interpreted by some (e.g. Wilkinson 1996) by reference to animal studies showing worse health among those in non-dominant positions in hierarchical societies. Our evidence suggests, on the contrary, that the features of jobs that give greater life satisfaction (and by extension, better health outcomes) do not relate to control (as measured by decision-making content of the job) but instead to trustworthy management, variety, and demand for skills, features that may well be found in higher-level jobs in the Whitehall hierarchy.

As can be seen from the job satisfaction equations in Table 3, the extent of workplace trust is by far the strongest determinant of job satisfaction. This provides our key measure of social capital in the workplace.

4. Valuing Workplace Social Capital

Although job satisfaction has long been known to have predictive power for absenteeism, illness, and productivity, there has been less study of the role of trust and social capital as contributors to job satisfaction. In a parallel way, most studies of social capital and its

effects have concentrated on the influence of family, friends, and community groups, with much less attention thus far paid to either the causes or consequences of workplace social capital (Halpern 2005). Given the large fraction of waking hours spent in the workplace, it should perhaps be expected that workplace social capital might be strongly linked to life satisfaction.

The ESC, GSS and EDS surveys all contain some measure or measures of workplace trust. The ESC asks about the extent to which management can be trusted in the respondent's workplace, while the GSS and EDS ask to what extent there is trust among colleagues. The resulting ratios for the values of workplace trust are shown in Table 5, and Table 4 shows the ESC-based estimates of the values of other specific job characteristics.

The social capital literature (see Halpern 2005 for a recent review) gives a central place to trust, with high levels of trust being positively related to measures of social capital (and sometimes being used themselves as either proxy or direct measures of social capital), with causation likely to flow both ways (Putnam 2000). The well-being equations in this paper suggest that several different sorts of trust have direct effects on well-being. The fact that a variety of domain-specific trust measures have even greater well-being effects than the classical general trust responses gives us confidence that the large effects of trust on well-being are not simply due to influence of congenital optimism on both trust and reported well-being. Another demonstration that the measured effects of trust are not simply due to personality differences is provided by the GSS job satisfaction equations in Table 3. The coefficient on the trust variable drops only from 1.02 to .97 when the mastery scale is added, and its standard error remains below .06.

The preferred well-being equations in Table 1 show that trust in neighbours, trust in the police and trust in the workplace are all independently strong determinants of respondents' subjective well-being in both the ESC and GSS. The size and significance of the workplace trust effects are even larger than for the other domains. In both surveys, inclusion of the specific trust measures renders the general trust measure insignificant.

Thus it is no surprise to see in Table 5 that there are very large compensating differentials for workplace trust. The lowest estimate we can obtain is from the GSS equation including mastery and other domains of satisfaction. We also include the GSS estimates without these variables for comparison with the ESC and EDS results, which cannot make these extra adjustments. The adjusted (lowest) GSS estimate for the ratio is 1.75, measured as the log change in income corresponding to a move from the bottom to the top of workplace trust (which is converted from the 10-point scale to a zero to 1.0 scale so as to have the same scale as the other trust variables). In ESC, the mean workplace trust response is 6.5 on the ten-point scale, with a standard deviation of 2.5. The modal answer is 8. To move up one point on the 10-point scale, using the lowest GSS estimate, has a log income value of .175, almost $13,000 for a modal family income of $65,000.

Our estimates are among the first using measures of life satisfaction to estimate compensating variations for job characteristics, and are the first we know of to provide estimates of the value of workplace trust. Our results are very large, and remain so even when we make a number of adjustments designed to remove risks of over-estimation. Our workplace trust results are independently estimated from three different large Canadian surveys, using different samples, and different question wording. That all three surveys should show such consistently large effects convinces us of the likely importance of our results. The estimated life satisfaction effects of workplace trust are so large as to suggest that there are large unexploited gains available for trust-building activities by managers, shareholders and employees. Although current levels of workplace trust in Canada are already fairly high (almost two-thirds of employed ESC respondents rate workplace trust at 7 or better on a ten-point scale), even small improvements promise large returns, and there also a significant number of employers and employees trapped in an environment of very low trust.

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Figure 1: An overview of potential biases

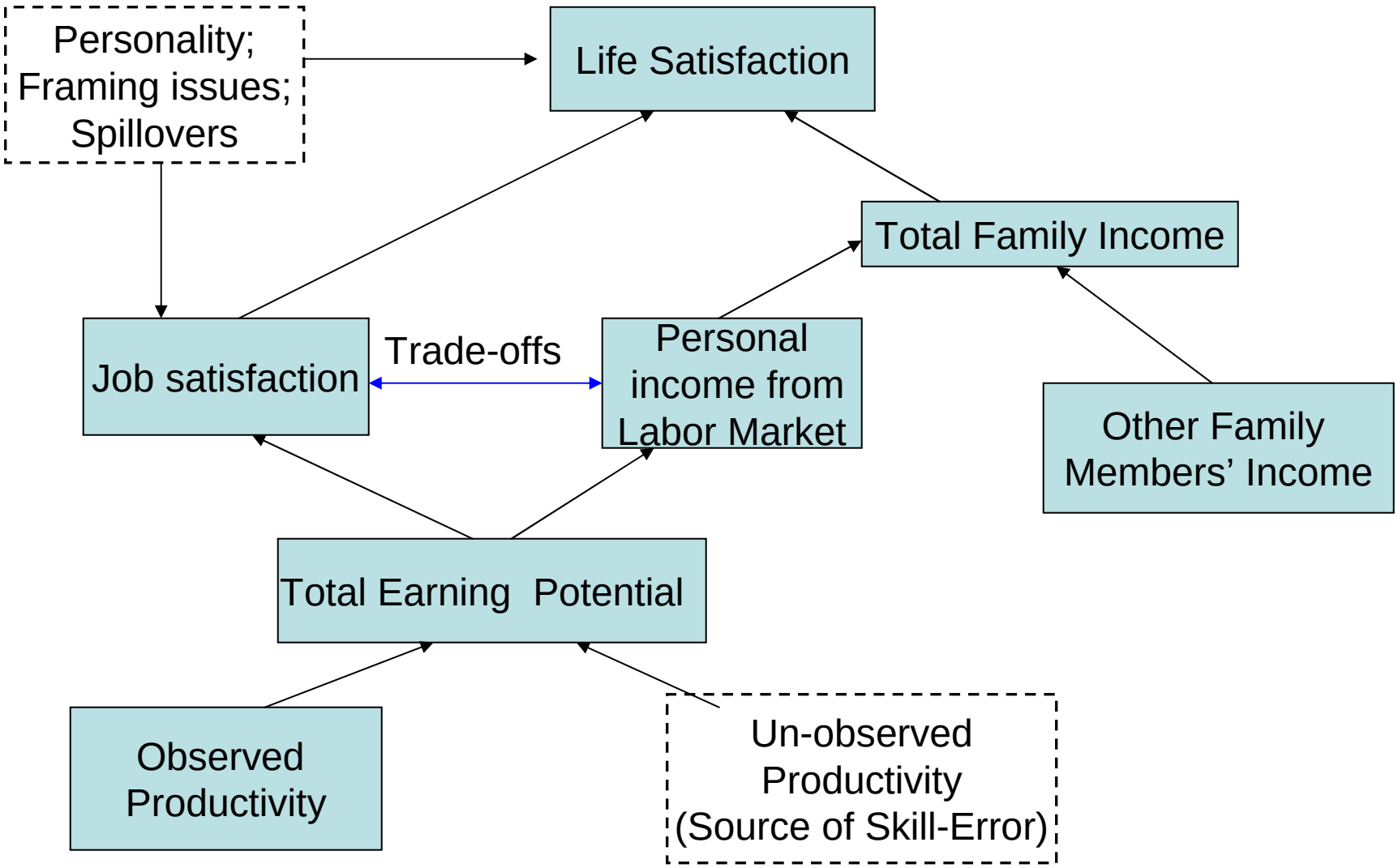

Table 1: Preferred Well-Being Equations in ESC and GSS, Survey Ordered Probit

D.V: Life satisfaction	ESC Sample						GSS Sample	
	Number of obs=1739		Number of obs=1748		Number of obs=1758		Numberof obs = 9949	
	F(28, 888)=9.97		F(33, 886)=9.75		F(27, 895)=10.02		F(37, 3532) = 66.00	
	Coef.	Std. Err.	Coef.	Std. Err.			Coef.	Std. Err.
Mastery net of income							1.056	0.102
Non financial job satisfaction	0.156	0.022			0.152	0.022	0.151	0.009
Log of personal income	0.229	0.044	0.200	0.047				
Log of other family members' income	0.056	0.017	0.065	0.018				
Log of total household income					0.248	0.046	0.215	0.029
Log of average household income in the CT	-0.161	0.085	-0.167	0.085	-0.176	0.083	-0.194	0.042
Satisfaction with health							0.203	0.015
Satisfaction with the way other time spent							0.204	0.010
Satisfaction with financial situation							0.161	0.010
Job: Makes own decision			-0.156	0.115				
Job: Requires skill			0.340	0.120				
Job: Have enough time			0.210	0.094				
Job: Free of conflicting demand			0.139	0.091				
Job: Has variety of tasks			0.377	0.131				
Job: Trust toward management			0.619	0.121				
Health status	0.253	0.036	0.266	0.036	0.254	0.036	0.036	0.021
Gender: Male	-0.110	0.054	-0.126	0.054	-0.080	0.051	-0.104	0.025
Age Group: 25~34	-0.261	0.104	-0.291	0.104	-0.221	0.103	-0.179	0.059
Age Group: 35~44	-0.096	0.109	-0.157	0.108	-0.072	0.105	-0.279	0.060
Age Group: 45~54	-0.166	0.113	-0.197	0.113	-0.124	0.111	-0.307	0.064
Age Group: 55~64	0.082	0.149	0.081	0.148	0.130	0.144	-0.274	0.069
Age Group: 65 up	-0.059	0.293	0.013	0.295	0.071	0.306	-0.076	0.154
Marital Status: Married	0.272	0.084	0.264	0.084	0.299	0.083	0.320	0.037
Marital Status: As Married	0.384	0.103	0.345	0.103	0.411	0.101	0.215	0.044
Marital Status: Divorced	-0.091	0.168	-0.092	0.167	-0.072	0.163	-0.123	0.071
Marital Status: Separated	-0.267	0.152	-0.216	0.156	-0.245	0.148	-0.056	0.053
Marital Status: Widowed	-0.444	0.361	-0.440	0.356	-0.413	0.360	-0.221	0.111
Education: High school	-0.033	0.117	-0.044	0.117	-0.045	0.116	-0.180	0.059
Education: Between	-0.022	0.106	-0.044	0.107	-0.032	0.106	-0.154	0.052
Education: University Degree	-0.020	0.110	-0.043	0.111	-0.011	0.110	-0.234	0.057
Contacts with family member outside household	0.079	0.096	0.098	0.096	0.104	0.095	0.169	0.044
Contacts with friends	0.212	0.106	0.206	0.107	0.213	0.105	0.009	0.056

Contacts with neighbours	-0.013	0.093	0.001	0.094	0.011	0.091	-0.036	0.046
Number of membership or extend of activeness	-0.013	0.017	-0.012	0.016	-0.014	0.016	-0.013	0.033
Trust in general	0.057	0.062	0.070	0.062	0.056	0.062	-0.074	0.030
Trust in neighbours	0.179	0.083	0.167	0.084	0.161	0.082	0.071	0.017
Trust in police / Confidence in police	0.298	0.110	0.254	0.113	0.290	0.109	0.238	0.063
Importance of religion	0.132	0.109	0.147	0.110	0.139	0.109	0.097	0.048
Frequency of attending religious services	-0.024	0.116	0.002	0.117	-0.039	0.114	-0.061	0.054
Immigrant							-0.019	0.040
Ethnic: Aboriginal							0.133	0.094
Ethnic: Chinese							-0.090	0.080
Ethnic: South Asia							-0.203	0.103
Ethnic: Others (not from major European countries)							0.014	0.041
Living in non-tracted area							-0.022	0.032
/cut1	0.883	0.968	0.971	0.971	0.669	0.938	-0.417	0.528
/cut2	1.009	0.969	1.096	0.973	0.788	0.941	0.112	0.507
/cut3	1.136	0.971	1.224	0.976	0.909	0.942	0.607	0.501
/cut4	1.344	0.968	1.434	0.973	1.111	0.941	0.934	0.501
/cut5	1.842	0.970	1.945	0.977	1.610	0.945	1.873	0.500
/cut6	2.162	0.971	2.265	0.977	1.924	0.946	2.453	0.502
/cut7	2.843	0.972	2.949	0.979	2.596	0.948	3.503	0.504
/cut8	3.754	0.975	3.866	0.983	3.508	0.951	4.778	0.507
/cut9	4.370	0.977	4.481	0.984	4.115	0.952	5.704	0.510

* All satisfaction variables are in the scale of 1~10, while all other variables are in the scale of 0~1, where 1 represent the highest level permitted by the survey questions and responses

Table 2: Experiments performed before reaching the final GSS equations in Table 1,
Survey Ordered Probit

D.V: Life satisfaction	GSS Sample							
	of obs = 9949		#obs = 9949		of obs = 9949		of obs = 9949	
	F(37, 3532) = 64.90		F(33,3536) = 59.03		F(34,3535) = 60.34		F(36,3533) = 69.57	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Mastery net of income	0.893	0.119			1.207	0.101	1.110	0.101
JSN instrumented by trust in co-workers	0.264	0.049						
Non financial job satisfaction			0.240	0.009	0.232	0.009	0.182	0.009
Log of total household income	0.211	0.029	0.167	0.029	0.174	0.029	0.187	0.029
Log of average household income in the CT	-0.182	0.041	-0.171	0.040	-0.182	0.040	-0.189	0.041
Satisfaction with health	0.161	0.022					0.218	0.015
Satisfaction with the way other time spent	0.193	0.011					0.235	0.010
Satisfaction with financial situation	0.129	0.015						
Health status	0.045	0.022	0.321	0.016	0.302	0.016	0.039	0.021
Gender: Male	-0.099	0.026	-0.070	0.025	-0.065	0.025	-0.115	0.025
Age Group: 25~34	-0.185	0.060	-0.242	0.057	-0.223	0.057	-0.161	0.059
Age Group: 35~44	-0.275	0.061	-0.397	0.057	-0.365	0.058	-0.260	0.059
Age Group: 45~54	-0.311	0.064	-0.454	0.061	-0.396	0.062	-0.272	0.063
Age Group: 55~64	-0.297	0.070	-0.376	0.066	-0.316	0.067	-0.234	0.069
Age Group: 65 up	-0.144	0.150	-0.199	0.151	-0.126	0.152	0.039	0.147
Marital Status: Married	0.306	0.037	0.276	0.035	0.285	0.035	0.307	0.036
Marital Status: As Married	0.189	0.045	0.159	0.042	0.159	0.042	0.199	0.043
Marital Status: Divorced	-0.139	0.070	-0.244	0.065	-0.252	0.065	-0.194	0.069
Marital Status: Separated	-0.063	0.053	-0.078	0.051	-0.098	0.051	-0.111	0.052
Marital Status: Widowed	-0.237	0.111	-0.180	0.109	-0.182	0.109	-0.142	0.110
Education: High school	-0.152	0.061	-0.208	0.057	-0.215	0.057	-0.186	0.059
Education: Between	-0.122	0.053	-0.189	0.050	-0.227	0.050	-0.170	0.052
Education: University Degree	-0.208	0.057	-0.271	0.055	-0.324	0.055	-0.209	0.057
Contacts with family member outside household	0.160	0.043	0.209	0.043	0.212	0.043	0.181	0.044
Contacts with friends	-0.028	0.057	0.132	0.053	0.121	0.053	0.009	0.055
Contacts with neighbours	-0.043	0.046	-0.001	0.046	-0.005	0.046	-0.022	0.046
Number of membership or extend of activeness	0.001	0.034	0.042	0.032	0.005	0.032	-0.020	0.033
Trust in general	-0.075	0.030	-0.025	0.029	-0.068	0.030	-0.080	0.030
Trust in neighbours	0.061	0.017	0.126	0.017	0.120	0.017	0.083	0.017
Trust in police / Confidence in police	0.199	0.064	0.311	0.061	0.287	0.061	0.282	0.063
Importance of religion	0.077	0.048	0.105	0.048	0.120	0.048	0.119	0.048

Frequency of attending religious services	-0.070	0.053	-0.089	0.053	-0.078	0.054	-0.064	0.054
Immigrant	-0.031	0.042	-0.033	0.038	-0.007	0.038	-0.027	0.040
Ethnic: Aboriginal	0.110	0.095	0.147	0.085	0.127	0.084	0.129	0.092
Ethnic: Chinese	-0.058	0.080	-0.087	0.082	-0.028	0.082	-0.011	0.082
Ethnic: South Asia	-0.167	0.100	-0.182	0.109	-0.126	0.111	-0.186	0.102
Ethnic: Others (not from major European countries	0.016	0.041	-0.016	0.041	-0.003	0.041	0.007	0.041
Living in non-tracted area	-0.022	0.032	-0.001	0.031	0.009	0.031	-0.021	0.032
/cut1	-0.045	0.543	-1.233	0.505	-1.192	0.505	0.518	0.516
/cut2	0.481	0.527	-0.803	0.492	-0.748	0.491	1.030	0.502
/cut3	0.955	0.525	-0.438	0.487	-0.372	0.486	1.501	0.497
/cut4	1.274	0.524	-0.195	0.488	-0.122	0.486	1.817	0.498
/cut5	2.177	0.522	0.540	0.487	0.630	0.487	2.720	0.497
/cut6	2.738	0.524	1.009	0.489	1.108	0.488	3.274	0.499
/cut7	3.759	0.525	1.888	0.491	2.001	0.491	4.284	0.501
/cut8	5.003	0.527	2.979	0.494	3.106	0.494	5.520	0.504
/cut9	5.906	0.529	3.783	0.496	3.917	0.495	6.424	0.507

Table 3: Job Satisfaction Equations of ESC and GSS with and without mastery scale
Survey Ordered Probit

ESC Sample			GSS Sample				
D.V. Job satisfaction	Number of obs=2032 F(18, 937)=45.62		D.V. Job Satisfaction	obs# 11085; F(12, 3793)=64.15		obs# 11085; F(13, 3792)=66.74	
	Coef.	Std. Err.		Coef.	Std. Err.	Coef.	Std. Err.
			Mastery net of income			0.829	0.090
Log of personal income	0.187	0.042	Log of total household	0.102	0.021	0.077	0.021
Log of other family members' income	0.016	0.015					
Job: Makes own decision	0.190	0.087					
Job: Requires skill	0.307	0.105					
Job: Have enough time	0.425	0.087					
Job: Free of conflicting demand	0.299	0.082					
Job: Has variety of tasks	0.222	0.113					
Job: Trust toward management	3.491	0.150	Trust in co-workers	1.017	0.056	0.949	0.057
Gender: Male	0.062	0.032	Gender: Male	-0.036	0.025	-0.029	0.025
Health status	-0.151	0.049	Health status	0.237	0.014	0.216	0.014
Age Group: 25~34	-0.165	0.105	Age Group: 25~34	-0.039	0.052	-0.015	0.052
Age Group: 35~44	-0.289	0.101	Age Group: 35~44	-0.089	0.052	-0.055	0.052
Age Group: 45~54	-0.139	0.106	Age Group: 45~54	-0.080	0.055	-0.030	0.055
Age Group: 55~64	0.069	0.137	Age Group: 55~64	0.026	0.058	0.084	0.059
Age Group: 65 up	-0.019	0.276	Age Group: 65 up	0.325	0.119	0.391	0.119
Education: High school	-0.111	0.105	Education: High scho	-0.273	0.051	-0.281	0.051
Education: Between	-0.153	0.094	Education: Between	-0.322	0.041	-0.354	0.041
Education: University Degree	-0.251	0.093	Education: University	-0.340	0.045	-0.382	0.045
/cut1	1.808	0.443	/cut1	-0.002	0.207	0.172	0.205
/cut2	2.289	0.444	/cut2	0.251	0.205	0.427	0.203
/cut3	2.746	0.441	/cut3	0.496	0.206	0.674	0.204
/cut4	3.225	0.435	/cut4	0.694	0.206	0.874	0.204
/cut5	3.817	0.441	/cut5	1.165	0.206	1.350	0.204
/cut6	4.291	0.442	/cut6	1.503	0.207	1.690	0.205
/cut7	5.146	0.444	/cut7	2.098	0.207	2.289	0.205
/cut8	6.258	0.452	/cut8	2.881	0.208	3.077	0.206
/cut9	6.897	0.454	/cut9	3.454	0.210	3.653	0.208

Table 4: Estimated Compensating Differentials and Standard Errors

Panel a: Compensating differentials for non-financial job satisfaction		Estimate	Std. error	Std Error of the ratio		$ Equivalents for per unit change of JSn*	Std error in $ value
				Delta Method	Bootstrap Method		
ESC-preferred	Ratio	0.681		0.162		$31,231	$7,434
	Non financial job satisfaction	0.156	0.022				
	Log of personal income	0.229	0.044				
ESC-Estimated with total household Income	Ratio	0.614		0.136		$55,052	$12,208
	Non financial job satisfaction	0.152	0.022				
	Log of household income	0.248	0.046				
GSS-preferred	Ratio	0.704		0.103	0.097	$66,420	$9,693
	Non financial job satisfaction	0.151	0.009				
	Log of household income	0.215	0.029				
GSS-Estimated using JSn instrumented by trust in co-workers	Ratio	1.249		0.275	0.257	$161,716	$35,545
	Non financial job satisfaction	0.264	0.049				
	Log of household income	0.211	0.029				
Panel b: Compensating differentials for specific job characteristics in ESC						$ Equivalents from bottom to top	
ESC, from the reduced-form regression	Ratio	-0.778		0.578		not significant	
	Job: Makes own decision	-0.156	0.115				
	Log of personal income	0.200	0.047				
	Ratio	1.701		0.797		$143,365	
	Job: Requires skill	0.340	0.120				
	Log of personal income	0.200	0.047				
	Ratio	1.048		0.517		$59,270	
	Job: Have enough time	0.210	0.094				
	Log of personal income	0.200	0.047				
	Ratio	0.697	0.492	0.492		not significant	
	Job: Free of conflicting demand	0.139	0.091				
	Log of personal income	0.200	0.047				
	Ratio	1.884		0.823		$178,517	
	Job: Has variety of tasks	0.377	0.131				
	Log of personal income	0.200	0.047				
	Ratio	3.093		0.889		$673,479	
	Job: Trust toward management	0.619	0.121				
	Log of personal income	0.200	0.047				

* The monetary equivalents are for a one-unit change in non-financial job satisfaction, which in ESC ranges from 0.16~7, they are estimated based on

median personal income of $32,000, and median household income of $65,000. Table 8 has the monetary equivalents based on movements in the distribution of non-financial job satisfaction.

Table 5: Compensating Differentials for Workplace Trust

GSS		Estimate	Std Error	Std Error of the ratio		Monetary equivalents: from 75% to top in distr. of work trust
				Delta	Bootstrap	
step1, EDS-	Ratio	4.259		0.841	0.804	$60,804
-like equation	Trust in co-workers	0.653	0.065			
	Log of household income	0.153	0.027			
step2, Add	Ratio	3.678		0.746	0.742	$48,257
mastery_n	Trust in co-workers	0.596	0.066			
	Log of household income	0.162	0.029			
step3, add	Ratio	1.754		0.381	0.370	$17,616
other domains	Trust in co-workers	0.380	0.070			
of satisfaction	Log of household income	0.216	0.029			
EDS	Ratio	6.546		1.208	1.263	$132,389
	Trust in co-workers	0.811	0.064			
	Log of household income	0.124	0.022			
ESC	Ratio	2.519		0.637		$28,076
	Job: Trust toward management	0.595	0.120			
	Log of household income	0.236	0.046			

Table 6: Comparing Direct and Indirect Effects of Job Characteristics in ESC

	In reduced form regression*	Implied by instrument regression through jobsat_n**
Job: Makes own decision	-0.156	0.044
Job: Requires skill	0.340	0.061
Job: Have enough time	0.210	0.070
Job: Free of conflicting demand	0.139	0.049
Job: Has variety of tasks	0.377	0.015
Job: Trust toward management	0.619	0.742

** can also be found in Table 1*

*** Essentially these are products of job attributes' own coefficients on JSn and JSn's coefficient on life satisfaction*

Table 7: Redo Table 1's GSS regression, excluding respondents whose answer to satisfaction questions lacks variation

	Full Sample	Variation*>2	Variation*>3
Non financial job satisfaction	0.151 [0.009]	0.128 [0.009]	0.124 [0.009]
Log of total household income	0.215 [0.029]	0.188 [0.032]	0.185 [0.033]
sample size	9949	7721	6871
	Variation*>4	VarCoef**>0.1	VarCoef>0.15
Non financial job satisfaction	0.107 [0.009]	0.135 [0.009]	0.097 [0.010]
Log of total household income	0.175 [0.033]	0.184 [0.031]	0.168 [0.039]
sample size	5613	6482	4202

** Variation = Variation of Lsatis and the four domian satisfactions*

*** VarCoef =Standard deviation of the five satisfaction measures / Mean of the five measures*

Table 8: Monetary Equivalence of a movement in distribution of job satisfaction

a). Distribution of self-reported job satisfaction and calculated non-financial job satisfaction that is instrumented by job characteristics and workplace trust, ESC

Actual Reported Jobsatis	Cumlative %	Calculated Jobsat_n	Cumlative %
1	1.31	0.17	0
2	2.37	1.69	5
3	4.63	2.39	10
4	8.09	2.85	15
5	15.49	3.20	20
6	24.74	3.47	25
7	46.9	3.73	30
8	75.95	3.93	35
9	87.61	4.11	40
10	100	4.29	45
		4.44	50
		4.63	55
		4.78	60
		4.95	65
		5.12	70
		5.28	75
		5.44	80
		5.67	85
		5.98	90
		6.32	95
		6.99	100

b). Estimated Monetary Equivalence of a movement of non-financial J.S.

from the 50th to the 75th percentile	
In Units of JSn	0.84
Monetary Equivalence	
Estimated using Personal Income	$24,720
Estimated using Household Income	$43,856
from the 75th to the 90th percentile	
In Units of JSn	0.70
Monetary Equivalence	
Estimated using Personal Income	$19,555
Estimated using Household Income	$34,884

Appendix Tables

A-1: First Stage Regression on Job satisfaction in ESC and GSS, Survey Linear Regression

D.V: Job satisfaction	ESC Sample				GSS Sample	
	Number of obs=1739		Number of obs=1758		Numberof obs = 9949	
	R-squared=0.5122		R-squared=0.5088		F(37, 3532) = 51.70	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Mastery net of income					1.028	0.159
Log of personal income	0.287	0.058				
Log of other family members' income	0.034	0.022				
Log of total household income			0.243	0.067	0.236	0.044
Log of average household income in the CT	-0.192	0.103	-0.174	0.104	-0.028	0.067
Satisfaction with health					0.303	0.021
Satisfaction with the way other time spent					0.043	0.013
Satisfaction with financial situation					0.225	0.014
Job: Makes own decision	0.284	0.136	0.312	0.135		
Job: Requires skill	0.393	0.148	0.445	0.147		
Job: Have enough time	0.449	0.125	0.421	0.126		
Job: Free of conflicting demand	0.317	0.114	0.317	0.114		
Job: Has variety of tasks	0.096	0.166	0.163	0.167		
Job: Trust toward management	4.761	0.172	4.727	0.173		
Health status	0.035	0.043	0.031	0.043	-0.084	0.031
Gender: Male	-0.155	0.068	-0.069	0.065	-0.019	0.039
Age Group: 25~34	-0.213	0.144	-0.130	0.143	0.102	0.092
Age Group: 35~44	-0.343	0.152	-0.245	0.148	0.051	0.093
Age Group: 45~54	-0.179	0.157	-0.085	0.153	0.098	0.097
Age Group: 55~64	0.024	0.181	0.112	0.173	0.216	0.103
Age Group: 65 up	0.189	0.356	0.275	0.337	0.484	0.179
Marital Status: Married	-0.025	0.106	0.002	0.105	0.032	0.054
Marital Status: As Married	-0.179	0.141	-0.140	0.138	0.154	0.069
Marital Status: Divorced	-0.045	0.176	0.061	0.172	0.116	0.116
Marital Status: Separated	-0.057	0.184	-0.005	0.186	0.088	0.087
Marital Status: Widowed	-0.316	0.463	-0.204	0.469	0.142	0.162
Education: High school	-0.205	0.137	-0.209	0.135	-0.235	0.084
Education: Between	-0.177	0.133	-0.174	0.132	-0.257	0.068
Education: University Degree	-0.295	0.131	-0.261	0.128	-0.228	0.074
Contacts with family member outside household	0.083	0.116	0.096	0.116	0.019	0.068

Contacts with friends	0.414	0.137	0.430	0.135	0.274	0.084
Contacts with neighbours	0.098	0.123	0.080	0.122	0.124	0.070
Number of membership or extend of activeness	0.016	0.021	0.014	0.021	-0.123	0.050
Trust in general	0.029	0.074	0.042	0.075	-0.093	0.044
Trust in neighbours	0.008	0.110	0.022	0.109	-0.070	0.027
Trust in police / Confidence in police	-0.163	0.141	-0.203	0.141	0.215	0.093
Importance of religion	0.247	0.132	0.243	0.132	0.178	0.073
Frequency of attending religious services	-0.087	0.128	-0.095	0.127	0.067	0.075
Immigrant					0.141	0.063
Ethnic: Aboriginal					0.186	0.120
Ethnic: Chinese					-0.258	0.119
Ethnic: South Asia					-0.247	0.151
Ethnic: Others (not from major European countries)					-0.005	0.059
Living in non-tracted area					-0.009	0.049
Constant	1.956	1.125	2.191	1.168	1.816	0.780

A-2: Regressing Personal Income on workplace variables, ESC and GSS
Survey Linear Regression

ESC			GSS		
Number of obs		2520	Number of obs		11427
F(16, 1100)		74	F(11, 3837)		237.500
R-squared		0.317	R-squared		0.285
lninc_p	Coef.	Std. Err.	lninc_p	Coef.	Std. Err.
j_owndec	0.283	0.051			
j_skill	0.499	0.055			
j_time	-0.115	0.042			
j_free	-0.087	0.045			
j_varie	0.169	0.064			
emp_tr	-0.266	0.058	tr_col	0.022	0.029
male	0.367	0.024	male	0.403	0.014
health	0.050	0.018	health	0.063	0.008
age2534	0.360	0.052	age2534	0.538	0.034
age3544	0.526	0.048	age3544	0.742	0.035
age4554	0.619	0.047	age4554	0.789	0.035
age5564	0.659	0.061	age5564	0.733	0.038
age65up	0.537	0.102	age65up	0.753	0.079
zedu1	0.132	0.045	zedu1	0.173	0.030
zedu2	0.190	0.040	zedu2	0.301	0.025
zedu3	0.470	0.042	zedu3	0.644	0.028
_cons	8.884	0.112	_cons	9.038	0.050

A-3: Correlation Tables
a. ESC

	lsatis	lninc_p	lninc_h	g_lninca	jobsat_1	j_owndec	j_skill	j_time
lsatis	1							
lninc_p	0.1108	1						
lninc_h	0.1851	0.5773	1					
g_lninca	0.0356	0.1821	0.2637	1				
jobsat_1	0.0955	0.3468	0.2658	0.0312	1			
j_owndec	0.0623	0.4422	0.3473	0.1201	0.7392	1		
j_skill	0.0833	0.4838	0.3592	0.1116	0.7384	0.8354	1	
j_time	0.06	0.248	0.2046	0.0607	0.688	0.6448	0.6136	1
j_free	0.0766	0.2245	0.1678	0.0182	0.6245	0.5603	0.5555	0.7104
j_varie	0.0728	0.4355	0.3335	0.0994	0.7709	0.8444	0.8632	0.6817
emp_tr	0.0989	0.317	0.2491	0.067	0.8408	0.7518	0.7234	0.7069
health	0.1038	-0.0241	0.0135	-0.0374	0.1733	-0.0496	-0.0462	-0.027
male	0.0048	0.2204	0.0843	0.0093	0.0424	0.082	0.0789	0.08

	j_free	j_varie	emp_tr	health	male
j_free	1				
j_varie	0.5928	1			
emp_tr	0.6483	0.7745	1		
health	-0.0062	-0.0551	0.0137	1	
male	0.0625	0.0481	0.0366	0.0004	1

b. GSS

	lsatis	jobsatis	mastery	lninc_p	tr_col	health	male	age
lsatis	1.000							
jobsatis	0.433	1.000						
mastery	0.241	0.135	1.000					
lninc_p	0.045	0.080	0.158	1.000				
tr_col	0.211	0.252	0.149	0.061	1.000			
health	0.330	0.211	0.201	0.106	0.121	1.000		
male	-0.016	0.004	-0.002	0.267	-0.023	-0.006	1.000	
age	-0.051	0.037	-0.123	0.240	0.136	-0.109	0.007	1.000
mem_act	0.057	0.022	0.161	0.141	0.094	0.105	0.014	0.010
trust	0.092	0.068	0.173	0.147	0.339	0.104	0.011	0.100
tr_nei	0.172	0.138	0.117	0.117	0.482	0.103	0.004	0.222

	mem_act	trust	tr_nei
mem_act	1.000		
trust	0.147	1.000	
tr_nei	0.101	0.370	1.000

A-4: Some distributions

Distribution of reported life satisfaction, GSS

Job Satisfaction	% distribution
1	0.68
2	0.52
3	0.83
4	1.14
5	5.72
6	5.78
7	17.54
8	31.56
9	19.27
10	16.95

Distribution of reported life satisfaction, ESC

Job Satisfaction	% distribution
1	0.8
2	0.44
3	0.51
4	1.38
5	4.63
6	5.14
7	18.22
8	31.78
9	17.71
10	19.39

Distribution of reported job satisfaction, GSS

Job Satisfaction	% distribution
1	1.33
2	1
3	1.62
4	1.93
5	7.44
6	7.6
7	18.49
8	28.39
9	16
10	16.2

Distribution of reported job satisfaction, ESC

Job Satisfaction	% distribution
1	1.31
2	1.06
3	2.26
4	3.46
5	7.4
6	9.26
7	22.16
8	29.05
9	11.66
10	12.39

Distribution of reported trust in colleagues GSS

trust in colleagues	% distribution
0	3.69
0.25	5.96
0.5	24.91
0.75	37.7
1	27.73

EDS

trust in colleagues	% distribution
0	2.21
0.25	5.21
0.5	24.76
0.75	38.46
1	29.39

Distribution of reported trust in management, ESC

trust toward management	% distribution
0	3.02
0.11	2.29
0.22	4.54
0.33	5.74
0.44	9.99
0.56	10.94
0.67	17.91
0.78	20.71
0.89	12.32
1	12.54

Distribution of other job characteristics in ESC

a)..job requires a high level of skill

j_skill	Freq.	Percent	Cum.
0	108	3.45	3.45
.33	298	9.51	12.96
.67	1,100	35.12	48.08
1	1,626	51.92	100.00
Total	3,132	100.00	

b)..job has a variety of tasks

j_varie	Freq.	Percent	Cum.
0	66	2.11	2.11
.33	170	5.43	7.54
.67	796	25.42	32.95
1	2,100	67.05	100.00
Total	3,132	100.00	

c)..job is free from conflicting demands

j_free	Freq.	Percent	Cum.
0	540	17.26	17.26
.33	963	30.78	48.03
.67	1,002	32.02	80.06
1	624	19.94	100.00
Total	3,129	100.00	

d)..You have enough time to get the job done

j_time	Freq.	Percent	Cum.
0	299	9.55	9.55
.33	514	16.41	25.96
.67	1,193	38.09	64.05
1	1,126	35.95	100.00
Total	3,132	100.00	

e)..job allows you to make a lot of decisions on your own

j_owndec	Freq.	Percent	Cum.
0	148	4.73	4.73
.33	306	9.77	14.50
.67	938	29.95	44.44
1	1,740	55.56	100.00
Total	3,132	100.00	

A-5: Exact Wording in the Survey

Vairble Name	Scale	Variable Names in raw data

ESC2

Life Saisfaction

lsatis 1~10 lifesat1

Now a question about life satisfaction. On a scale of 1-10 where ONE means dissatisfied and TEN means satisfied, all things considered how satisfied are you with your life as a whole these days?

Job Satisfaction

jobsat_1 1~10 jobsat_1

On a scale of 1 to 10, where 1 means very poor and 10 means very good, on average, how would you rate job satisfaction for workers at your workplace?

Workplace Trust

emp_tr zero to one jobsat_3

Using the same scale, how would you rate the level of trust that workers have in management at your workplace?

Job Characteristics

j_owndec zero to one jobdes_6

Your job allows you to make a lot of decisions on your own. Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree?

j_skill zero to one jobdes_7

Your job requires a high level of skill. Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree?

j_varie zero to one jobdes_8

Your job has a variety of tasks. Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree?

j_time zero to one jobdes_9

You have enough time to get the job done. Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree?

j_free zero to one jobdes10

Your job is free from conflicting demands. Do you strongly agree, somewhat agree, somewhat disagree or strongly disagree?

GSS

Life Satisfaction

Lsatis 1~10

Please rate your feelings about them, using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied". What about:

...your life as a whole right now?

Job Satisfaction

jobsatis 1~10

Please rate your feelings about them, using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied". What about

...your job or your main activity?

Other Domains of Satisfaction

Please rate your feelings about them, using a scale of 1 to 10 where 1 means "Very dissatisfied" and 10 means "Very satisfied". What about:

satis_h *…your health?*

satis_ot *…the way you spend your other time?*

satis_fn *…your finances?*

Workplace Trust

tr_col zero to one

Using a scale of 1 to 5 where 1 means 'Cannot be trusted at all' and 5 means 'Can be trusted a lot', how much do you trust

people you work with or go to school with?

Mastery Scale

mastery zero to one

Please tell me if you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree that:

…you have little control over the things that happen to you.

…there is really no way you can solve some of the problems you have.

…there is little you can do to change many of the important things in your life.

…you often feel helpless in dealing with problems of life

…sometimes you feel that you are being pushed around in life .

…what happens to you in the future mostly depends on you.

…you can do just about anything you really set your mind to.

EDS

Life Satisfaction

Lsatis Ts_Q010

All things considered, how satisfied are you with your life as a whole these days? 1 measures not satisfied at all and 5 means very satisfied

Workplace Trust

tr_col Ts_Q050

Using a scale of 1 to 5 where 1 means cannot be trusted at all and 5 means can be trusted alot, how much do you trust each of the following group of people:

...People that you work with or go to school with