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The relative effect of voice, autonomy, and the wage on satisfaction with work

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This article uses data from the 2004 wave of the Workplace Employment Relations Survey to investigate the relative effects of the wage, worker autonomy and voice on self-reported satisfaction with work. The article adds two innovations: it considers a disaggregated measure of job satisfaction that considers satisfaction with the work task itself, and it explicitly compares the relative explanatory power of the wage, voice and autonomy. It is found that voice and autonomy play a much larger role than the wage in explaining satisfaction with work. The results are consistent with the assertion that there is an important distinction between how individuals choose their place of work (decision utility) and what drives job satisfaction once they are employed (experience utility).

Keywords: autonomy; decision; job satisfaction; utility; voice; wage

Introduction

For individuals who engage in paid employment, job satisfaction is certainly one of the most important components of their overall well-being. However, while job satisfaction has been identified as an important economic variable because of its association with lower absenteeism (Wegge, Schmidt, Parkes and Dick 2007), voluntary quits (Freeman 1978) and positive association with work behavior that extends beyond perfunctory standards (Organ and Ryan 1995), job satisfaction is still a relatively 'new' subject of interest within Economics. By contrast, in both organizational behavior and management studies, job satisfaction is one of the most investigated variables (Cranny, Smith and Stone 1992; Spector 1997). Hamermesh (2004) likens the recent increase in interest in satisfaction studies in economics to the 'Mt. Everest phenomenon' or the mountain of extensive, potentially interesting attitudinal data that should be explored, that has only relatively recently become available.¹ Although this is certainly important, the increase in behavioral considerations within economics has changed the normative standards of economic analysis in the study of personnel and firm governance. This change contributed to an expansion of the scope of questions that are studied by economists – including job satisfaction.

In this article, we use the 2004 wave of the Workplace Employment Relations Survey (WERS) to investigate the relative importance of voice, autonomy and wages in explaining job satisfaction. We argue that the rational choice model (RCM), central in much of economic analysis of the firm, cannot readily accommodate the theory and study of job satisfaction, and satisfaction with work in particular. Instead, it is argued that a framework proposed by Kahneman and others (Kahneman, Wakker and Sarin 1997; Kahneman 1999; Kahneman and Sugdon 2005), that augments the scope of appraisal of

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welfare outcomes to include a measurement of experience utility – or the utility gained through experiencing a set of circumstances that one lives through – in addition to decision utility – the utility gained when revealing exogenously given preferences. Consistent with the concept of experience utility, we conceptualize self-reported levels of job satisfaction as a reflection of an attitude that a worker has toward his or her job after having gained some experience with their work and workplace.

There have been countless investigations into the determinants of job satisfaction over the years. The very large majority of these, however, have focused on case-studies, a single aspect of the workplace, or very broadly defined aspects of the workplace. We have overcome some of the limitations inherent in small-scale studies by using the 2004 wave of the WERS, a large nationally representative data set, which includes detailed questions on many aspects of the workplace including multiple questions on different aspects of job satisfaction, voice and autonomy, respectively. The WERS also allows a disaggregation of job satisfaction into seven component parts, of which we use one satisfaction with the work itself. This is an improvement over more aggregate measures of job satisfaction because satisfaction with the work itself is very closely related to the perceived cost of work, the central decision variable in economics.

Some authors, most notably Wood (2008), have begun to use these aspects of the WERS. This article adds to this literature in two ways. First, we contextualize the analysis of self-reported satisfaction in a new way by using the distinction between experience and decision utility. Second, the paper explicitly assesses the relative importance of the wage versus autonomy and voice in explaining job satisfaction. These two contributions are critical for understanding potential discrepancies between why an individual chooses a given job and what keeps the individual in that job.

Background

The modern foundation of economic theory is the RCM. Although the RCM takes many forms, for our purposes, two commonly used sets of assumptions are crucial.² First, it is typically assumed that preferences are revealed through choices, and that the revealed preferences are those that maximize (expected) utility (Read 2007). Through 1000 of studies that empirically examine the RCM framework, it has been shown that humans often reveal choices that would be inconsistent with utility maximization within the RCM. For example, individuals appear to use cognitive heuristics that can lead to systematic deviations from what is predicted by the RCM when evaluating probabilistic events (Kahneman and Tversky 1979), they regularly demonstrate time-inconsistent preferences (Thaler 1981; Laibson 1997), and the hedonic effect of favorable and unfavorable circumstances adjusts through time (Frederick and Loewenstein 1999).

Second, the Rational Actor Model implicitly conceptualizes work as a source of disutility; a pure cost that must be offset by extrinsic incentives. This logic has led to the development of ‘shirking models’ (e.g. Shapiro and Stiglitz 1984) that abstract from the notion that individuals draw upon employment itself as a source of utility through various avenues, including the social interaction they have with coworkers, feelings of accomplishment, the associated social status of work, or simply from performing the work task itself (Frey and Stutzer 2002). Both Lane (1991) and Juster (1991) find that most people rate ‘satisfying work’ as more important in explaining individual happiness than income, material possessions and most forms of leisure. Other studies, moreover, show that the psychological costs endured during a spell of unemployment typically include anxiety, loss of self-esteem and depression (Argyle 1989). What these studies suggest is both that work is not a pure cost, and more importantly that once

an individual has a job, attributes beyond pay may play an important role in shaping satisfaction with the work task itself, and with the job more generally.

Attitudinal Data

The emergence of large micro data sets linking individuals to particular types of organizational structures is rather recent. Despite this, the scope of research using these data is quite broad. Because of this, focus will be given primarily to studies looking at organizational structures that promote autonomy and participation in the workplace. Further, for reasons discussed in more detail below, the analysis in this article focuses on the satisfaction with the work itself, while the literature review discusses job satisfaction more generally. This is due to the fact that, to the authors' knowledge, this is one of the few studies that focuses on satisfaction with work itself.

In general, positive effects of participation and work teams on job satisfaction and motivation are corroborated in analyses of the US-based Workplace Representation and Participation Survey (WRPS) (Freeman and Rogers 1999; Freeman and Kleiner 2000), the European Survey on Working Conditions (Bauer 2004), data collected by the Institute of Work Psychology, and also in many firm-level case studies (Lawler and Hall 1970). A telephone survey conducted in Godard (2001), however, shows data that suggest that increasing levels of participatory workplace strategies can weaken and in some cases decrease job satisfaction because of new pressures and responsibilities. The association between stress and participatory workplaces has additionally been reported in Batt and Appelbaum (1995), Graham (1995), Lewchuck and Robertson (1997) and Appelbaum, Bailey, Berg and Kalleberg (2000). In a parallel strand of research, however, Judge, Thoresen, Bono and Patton (2001) suggest that job satisfaction is driven more by the personality traits of workers than the organizational structure of the firm.³

Within the prescriptive management and organizational behavior literature, one often encounters superlative hypotheses describing many virtuous cascades waiting for firms that should adopt institutions that provide workers with more autonomy and voice, including higher job satisfaction. While it is true that the empirical record on such issues is at least as old as scientific management (Taylor 1972), existing research consists largely of case studies on a small number of firms.

The bulk of research on voice and autonomy, moreover, focuses on the effects of specific organizational mechanisms (such as joint consultation or works councils), on job satisfaction. While there may be overlap between employee voice, autonomy and the firm policies designed to foster them, we acknowledge that this need not necessarily be the case. It is possible that employees and employers may perceive a formal policy aimed to provide voice or autonomy differently. We therefore have chosen to rely on the subjective evaluation that workers provide of the level of voice and autonomy that they have in the firm. The goal of this article is to evaluate the relative effect of employee voice, autonomy and job satisfaction using a unique attitudinal data reflective of employee perceptions of their own workplace.

Our own study is very similar to Wood (2008) because of the use of subjective evaluation data measuring voice, autonomy and satisfaction taken from the 2004 wave of the WERS. The emphasis of Wood's piece is in showing the importance of job characteristics for researchers interested in analyzing job satisfaction. Given that economists are relatively new in studying job satisfaction, it comes as no surprise that they too have neglected the importance of job characteristics for job satisfaction.

To be fair, Lazear (1996) mentions that economists have been able to theorize over the study of job characteristics that operate outside of the price system 'quite easily' by

transforming non-pecuniary components of the job into their monetary equivalents by equalizing differences or ‘compensating differentials’ (Rosen 1974). Evaluating the theory of compensating differentials empirically, however, presents significant challenges if workers sort according to the ability. Specifically, we lose the ability to confidently identify the trade-off between wages and job characteristics independent of ability. Of course, the theory of compensating differentials is rooted in the RCM, which, as we have illustrated above, may be problematic in and of itself. Because of this, a point of emphasis in our findings presented below is that job characteristics matter as much, if not more, as pecuniary benefits in the determination of satisfaction.

In consideration of these and other behavioral issues that conflict with the RCM framework, Kahneman (Kahneman et al. 1997; Kahneman 1999; Kahneman and Sugdon 2005) and others have advocated for augmenting the scope of appraisal of welfare outcomes to include a measurement of experience utility – the utility gained through experiencing a set of circumstances that one lives through – in addition to the decision utility – the utility gained when revealing exogenously given preferences. Consistent with the concept of experience utility, we conceptualize self-reported levels of job satisfaction as a reflection of an attitude that a worker has about his or her job characteristics after having gained some experience with his or her work and workplace. In particular, we investigate the relative impact of job characteristics that allow workers autonomy and voice using subjective evaluations of work conditions and satisfaction recorded in the 2004 wave of the WERS.⁴

Employee voice and autonomy

In a general sense, employee voice refers to the idea that workers can express their interests and concerns over firm matters to management in a meaningful manner. The precise meaning of the term, however, is without consensus, and the rationale for its application varies along different economic, moral and pragmatic dimensions. Dundon, Wilkinson, Marchington and Ackers (2004) provide some orientation to the many ways the term ‘voice’ is used in the literature by subdividing the meanings into four principal strands of thought.

- (1) *Voice as employee access to formal grievance procedures.* The extent that workers have an option to articulate their dissatisfaction via a complaint line to the manager or the encouragement of a speak-up program. Voice in this sense is thought to prevent the deterioration of employee–employer relations.
- (2) *Voice as a countervailing source of power that expressed through unionization and/or collective bargaining.* Employee voice in this sense of the term implies the formal recognition and legitimization of a collective organization as a coprincipal with management.
- (3) *Voice as a contribution from employees for better management in decision-making.* In the strategic HR literature, voice has been used to describe the delegation of decision-control rights to employees by forming flexible work schedules, work teams, quality circles and similar high-involvement management for the purposes of increasing employee productivity, innovation and commitment.
- (4) *Voice as a demonstration of mutuality and cooperative relations among all firm stakeholders.* Voice has been used to summarize any mechanisms that give direct, representative and consultative participation for the purposes of building a workplace culture that sustains high levels of trust, efficient information transfer and cooperation.

The three survey questions that we decided to use to measure subjective evaluations of employee 'voice' most closely align us with the uses of the term in the strategic HRM literature (McCabe and Lewin 1992; Huselid 1995). Specifically, our questions ask employees to express how effectively managers seek their views, respond to suggestions from employees and allow employees to influence final decisions. We believe that these questions help capture both the effectiveness of formal firm mechanisms such as upward problem-solving groups and the presence of suggestion schemes that self-managed teams or quality circles provide, but just as importantly, it also captures attitudes over informal means of communication that may also promote employee engagement and/or productivity.

Deci and Ryan (1985) define autonomy as the degree to which an individual feels free to use her own knowledge to make decisions that are causal. There are several domains where autonomy can be granted including setting one's work schedule, choosing how to do their work, or deciding where one does their work. The survey questions that we use from the 2004 WERS measuring the subjective evaluation of their autonomy meld nicely with this conceptualization of the term by asking workers to express the degree of influence a worker has over tasks to be completed, how tasks are to be completed, the pace of work, the order in which tasks are to be completed, and daily start and/or stop times.

Why might autonomy and voice affect job satisfaction?

Self-determination theory (Deci and Ryan 1985; Deci and Ryan 2000a,b) suggests that the effect of an external intervention can support or thwart one's satisfaction depending on how the extrinsic intervention affects one's sense of (1) autonomy, or the desire to self-organize their own actions and for their actions to be causal, (2) competence, or the desire to feel capable in affecting their surroundings, or (3) relatedness, or the desire to feel connected to and respected by a social group. That is, extrinsic incentives are thought to potentially crowd-out satisfaction if they are perceived as controlling, but conversely can crowd-in satisfaction if perceived as supportive of one's psychological needs. We aim to evaluate whether higher self-reported levels in worker autonomy and voice support one's sense of self-determination.

Further explanation can be found in the literature on subjective well-being, in particular the literature on hedonic adaption (Frederick and Loewenstein 1999). What this literature demonstrates is that reported levels of well-being adapt fairly quickly to the level of income (Easterlin 1974; Clark, Frijters and Shields 2008), but less quickly to other external events such as divorce. Self-determination theory, however, suggests that institutions supportive of autonomy, competence and relatedness have low levels of adaptation. We believe that the subjective evaluation data used in this study allow for an examination of this general hypothesis.

Data and descriptive statistics

The data come from the worker and occupation files of the 2004 wave of the WERS sponsored and collected in the UK by the Department of Trade and Industry, ACAS, the Economic and Social Research Council, and the Policy Studies Institute. The WERS survey is a nationally representative stratified random sample of UK workplaces with at least 10 employees, and samples not more than 25 employees from a given firm. There are approximately 2300 workplaces and 22,500 employees in the 2004 WERS.

The 2004 WERS contains seven questions on job satisfaction, five questions on autonomy and three questions on voice. The questions on autonomy are coded on a four-point scale with one being 'none' and four 'a lot'. The questions cover the degree of

influence a worker has over tasks to be completed, how tasks are to be completed, the pace of work, the order in which tasks are to be completed, and daily start and/or stop times. The questions regarding satisfaction and voice are all coded on a five-point scale with one being 'very dissatisfied' and five 'very satisfied'. The questions on voice cover how good managers are at seeking the views of employees, responding to suggestions from employees and allowing employees to influence final decisions.

The seven questions on job satisfaction cover satisfaction with achievement, initiative, influence, training, pay, job security and the work itself. For two reasons, the only aspect of job satisfaction that will be used in the analysis is satisfaction with the work itself. First, the analysis would become too unwieldy if all seven questions were analyzed separately, but there is no obvious way to condense them into a signal index. Second, satisfaction with work has a conceptual appeal given the question under study because it is very close to the individual cost of work. All else equal, a worker in a job with a higher subjective cost of work will almost certainly report a lower level of satisfaction with the work itself.

The difficulty in condensing the seven measures of job satisfaction into a single index is not entirely due to the fact that job satisfaction is a multifaceted issue that cannot be easily summarized. A principal components analysis indicates that the seven aspects of job satisfaction can be represented by one component that explains 81% of the variation in the seven factors. Thus, it is not that job satisfaction cannot be represented by a single index, but that choosing the proper index is not straightforward. If this difficulty were the only problem, then an index would certainly be preferable.⁵ The second issue, that satisfaction with the work itself is the most closely related with how economics approaches the individual cost of work, is a much more important reason to not combine the various aspects of job satisfaction.

In an ideal scenario, whether autonomy and/or voice increases job satisfaction would be tested by comparing two workers where the only difference is in the degree of autonomy/voice. In this ideal, the only cause of variation in satisfaction is autonomy and/or voice, and only the intrinsic valuation of the job itself should change. Given that this comparison is not possible with any existing data set, the satisfaction with work question provides the closest approximation. All else equal, if two individuals with different amounts of autonomy and/or voice within the same occupation report differing levels of satisfaction with the work itself, then this is quite robust evidence in favor of the proposed hypothesis.

The robustness of this approach is driven by the fact that, of all the satisfaction questions, satisfaction with work is the most intrinsic to the task itself. Variation in reported levels of satisfaction with the work itself should be driven primarily by the task being performed, and if the general nature of the stated hypothesis is correct, by the work environment. Regressions including occupation fixed effects will eliminate the effect of variation in the task performed. All that is left is variation in the work environment, captured by the remaining independent variables, including voice and autonomy.

Figure 1 provides a histogram of responses to the satisfaction with the work itself question. Over 50% of workers report being 'satisfied' with the work itself (category 4), roughly 20% report 'neither satisfied nor unsatisfied' (category 3) and roughly 20% of workers report being 'very satisfied' with the work itself. This pattern suggests that, without losing much information, the dependent variable can be condensed into a dichotomous variable that equals 1 if a worker reports being very satisfied with the work itself, and 0 otherwise. This dependent variable will be used for all regressions.

Table 1 contains the descriptive statistics. The final subsample of the data contains 19,050 observations. There are two primary sources of excluded observations. The first source is missing or otherwise unusable observations. The second source comes from a peculiarity associated with calculating an hourly wage in the WERS.

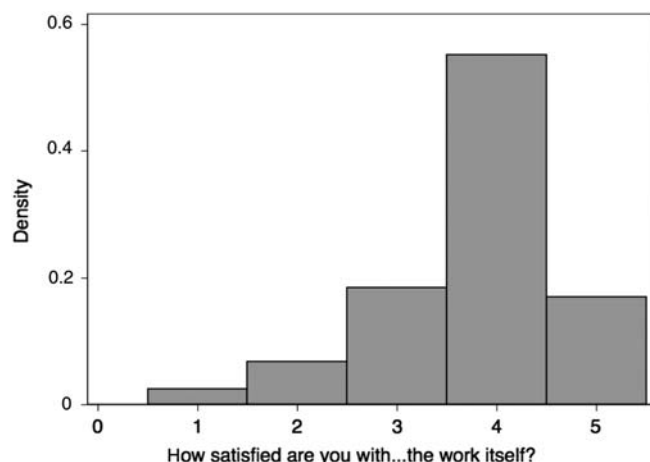


Figure 1. Histogram of 'satisfaction with work itself'.

Notes: Data are from the 2004 wave of the WERS. Based on the question 'How satisfied are you with the work itself.' Answers are coded on a five-point scale, with higher numbers indicating greater satisfaction.

One limitation of the WERS is that it only has categorical versions of weekly income and hourly wages. Further, the hourly wage variable only has four categories, with 75% of individuals falling into one wage category. The weekly income variable is disaggregated enough to be useful, but would require weekly income to be entered as a categorical variable, making regressions more difficult to interpret. Instead, an hourly wage is calculated by dividing usual weekly income categories by usual weekly work hours, which is not categorical. Clearly, this introduces noise into statistics based on the wage, which could bias the estimated coefficient on the wage toward zero.

It turns out that the results are sensitive to use the wage instead of weekly income, but not in the way one would likely expect. As will be seen, the coefficient on the wage is generally very small, but is always positive. The implied correlation between satisfaction and income

Table 1. Descriptive statistics of main variables.

<i>Variables</i>	<i>Mean</i>	<i>Std. Dev</i>	<i>N</i>
Wage	10.12	5.72	19,141
<i>Voice</i>			
Solicit views	0.45	0.50	19,141
Respond to suggestions	0.40	0.49	19,141
Influence decisions	0.27	0.44	19,141
<i>Autonomy</i>			
Tasks completed	0.35	0.48	19,141
Pace of work	0.37	0.48	19,141
How work done	0.50	0.50	19,141
Order completed	0.49	0.50	19,141
Start/stop time	0.26	0.44	19,141

Notes: Data are from the 2004 wave of the WERS. The wage is categorical self-reported usual weekly income including all sources of pay divide by continuous usual weekly work hours. Voice and autonomy variables are recoded to equal 1 if the related survey question equals 5, and 0 otherwise, thus the Mean reports the share of workers with the highest level of autonomy or voice.

when categorical weekly income is used is negative. Thus, in a sense, using the calculated hourly wage is a more conservative approach than using categorical weekly income.

The central hypothesis that job satisfaction increases with the amount of autonomy and voice a worker has over the workplace is illustrated in Table 2. For all aspects of both voice and autonomy, the share of workers who report being very satisfied with the work itself is statistically significantly higher. Consistent with Wood (2008), the table demonstrates the importance of the relationship between these two types of job attributes and job satisfaction. However, there are likely important correlates of job satisfaction that could reduce or eliminate the correlation between job satisfaction and voice and autonomy, respectively. Most importantly, jobs with more autonomy likely pay more, implying that the strong positive correlation between job satisfaction and autonomy is picking up the effect of the wage as well as the autonomy itself. The next section investigates this issue further with regression analysis.

Estimation results

The regression results can be found in Table 3. The dependent variable is a binary variable that equals 1 if a worker reports that he or she is “very satisfied” with the work itself, and 0 otherwise. The key independent variables are the wage, the three measures of voice and the five measures of autonomy. The remaining control variables, common to all regressions, include usual weekly work hours, and dummies for being a supervisor, a union member, female, married and a permanent employee. All regressions also contain categorical variables for age, education, tenure and race, as well as a set of dummies for three-digit SOC 2000 occupations. All regressions are Probit regressions, with marginal effects reported. Standard errors are clustered on the firm.

Column 1 of Table 3 contains the baseline results and is consistent with standard economic intuition, namely that the wage is positively correlated with job satisfaction. The estimated coefficient implies that a one standard deviation increase in the wage is associated with a 0.01% increase in the probability of being very satisfied with the work itself. Because of how the dependent variable is calculated, there is no existing research that can be used to assess the magnitude of this coefficient. But, given the general importance put on earnings in economic analysis, this effect seems quite small.

The problem with the baseline specification is that, besides occupation for dummies and the wage, it makes no attempt to control for job attributes. As mentioned before, two

Table 2. T-tests of means of key variables by level of job satisfaction.

	<i>Mean 1</i>	<i>Mean 2</i>	<i>T-stat</i>	<i>Std. Err.</i>
Wage	10.030	10.579	-0.549***	[0.110]
<i>Voice</i>				
Solicit views	0.409	0.672	-0.263***	[0.009]
Respond to suggestions	0.351	0.620	-0.269***	[0.009]
Influence decisions	0.230	0.464	-0.234***	[0.008]
<i>Autonomy</i>				
Tasks completed	0.303	0.558	-0.255***	[0.009]
Pace of work	0.329	0.555	-0.226***	[0.009]
How work done	0.451	0.717	-0.266***	[0.009]
Order completed	0.449	0.677	-0.228***	[0.009]
Start/stop time	0.231	0.381	-0.149***	[0.008]

Notes: Data are from the 2004 wave of the WERS. Income is categorical self-reported usual weekly income including all sources of pay. Voice and autonomy variables are recoded to equal 1 if related survey question equals 5, and 0 otherwise. Standard errors are in brackets. Significance levels: *10%, **5% and ***1%.

Table 3. Results of probit regressions for 'satisfaction with the work itself'.

<i>Variables</i>	<i>Base</i>	<i>Full</i>	<i>Voice</i>	<i>Autonomy</i>	<i>No Wage</i>
Wage	0.002** [0.001]	0.000 [0.001]	0.001* [0.001]	0.000 [0.001]	
<i>Voice</i>					
Solicit views		0.050*** [0.008]	0.061*** [0.009]		0.050*** [0.008]
Take suggestions		0.057*** [0.009]	0.067*** [0.010]		0.057*** [0.009]
Influence decisions		0.042*** [0.009]	0.058*** [0.010]		0.042*** [0.009]
<i>Autonomy</i>					
Tasks comp.		0.058*** [0.009]		0.073*** [0.009]	0.058*** [0.009]
Pace of work		0.024*** [0.008]		0.029*** [0.008]	0.024*** [0.008]
How work done		0.066*** [0.009]		0.075*** [0.009]	0.066*** [0.009]
Order completed		0.027*** [0.008]		0.030*** [0.008]	0.027*** [0.008]
Start/stop times		0.035*** [0.008]		0.042*** [0.008]	0.035*** [0.008]
N	19,050	19,050	19,050	19,050	19,050
Pseudo R ²	0.058	0.153	0.108	0.12	0.153
Likelihood ratio v. full model ^a	1640.343***	N/A	775.721***	578.534***	0.001

Notes: Data are from the 2004 wave of the WERS. The dependent variable equals 1 if satisfaction with the work itself equals 5. Coefficients are marginal effects. Voice and autonomy variables are recoded to equal 1 if the related survey question equals 5, and 0 otherwise. Standard errors are clustered on the firm, and are reported in brackets. Other control variables include supervisor status, female, age, union status, tenure, education, hours, marital status, race/ethnicity, and three digit SOC 2000 occupation. Significance levels: *10%, **5% and ***1%
^a Likelihood ratio test for whether given model is nested in full model. A statistically significant result means that the full model is a better fit than the given model.

job attributes that may be particularly important for job satisfaction are autonomy and voice. For the remaining regressions, the measures of autonomy and voice have been condensed into binary variables in a similar manner as the dependent variable, where the variable equals 1 if the worker reports being in the highest category, and 0 otherwise. The qualitative results are unchanged by this manipulation.

Column 2 of Table 3 reports the results of a regression with the addition of all measures of autonomy and voice. First, the estimated coefficient on the wage decreases by about 50% and is no longer statistically significant. Second, the estimated coefficients on autonomy and voice are all positive and significant, ranging in value from 0.027 for the order of tasks to 0.066 on control over how the work is done. Because this regression includes a set of three-digit occupation dummies, the positive association is not driven by individuals who do different jobs. Put simply, the results suggest that, within a group of workers who all do roughly the same thing, having more autonomy and/or voice is associated with higher levels of satisfaction with the work itself.

It is clear from the results in column 2 of Table 3 that voice and autonomy are important correlates with job satisfaction. And, because of the occupation dummies, it is unlikely that correlation is driven by omitted variable bias or reverse causality. But, because voice and autonomy are represented by binary variables while the wage is

continuous, it is not possible to directly assess the relative magnitude of the estimated coefficients. To assess the relative importance of voice, autonomy and the wage, we will instead turn to goodness-of-fit tests.

The simplest of the goodness-of-fit tests is the pseudo R-square. The pseudo R-square for the base model is 0.058. When autonomy and voice are included, this number jumps by 0.095 to 0.153. A likelihood ratio test of the full model versus the base model rejects the null hypothesis that the two models are equivalent at the 1% level, with a test statistic of 1640.34. Clearly, the full model explains significantly more of the variation in satisfaction than the base model does.

Columns 3–5 of Table 3 help piece apart where this increase in explanatory power is coming from. In column 3, the five measures of autonomy are excluded. The pseudo R-square falls to 0.108, and the likelihood ratio test again indicates that the full model provides a much better fit. A similar result holds when voice is excluded in column 4. The pseudo R-square drops to 0.128, and the likelihood ratio test indicates that the full model provides a better fit. Finally, comparison of the likelihood ratio test statistics for columns 3 and 4 indicates that autonomy contributes slightly more to explaining satisfaction than voice does.

The most interesting result, however, comes from column 6. In column 6, the wage is excluded. First, the coefficients on all measures of voice and autonomy remain unchanged when compared with the full model in column 2. Second, the pseudo R-Square also remains unchanged. And, finally, a likelihood ratio tests indicates that the no wage model is nested within the full model. This means that the two models are statistically indistinguishable from each other. Once measures of autonomy and voice are included in the regression model, the wage does not add any discernible explanatory power to the model at all.

These results, both the signs of the coefficients and the goodness-of-fit tests, are remarkably robust. One potential concern is that the three-digit occupation dummies are absorbing too much variation in the wage. This is not the case. When occupation dummies are excluded, the coefficient on the wage is still statistically insignificant when autonomy and voice are included. The results are also not sensitive to estimation strategy. Ordered probit regressions using all five levels of satisfaction with the work itself produce the same qualitative results. Similarly, as mentioned, entering autonomy and voice as fourth and fifth level variables, respectively, produces the same qualitative results. And, finally, the same pattern does not hold for satisfaction with pay. For satisfaction with pay, the coefficient on the wage is always positive and statistically significant, and has a statistically significant amount of explanatory power, suggesting that it is not a problem with how the wage is measured.

Discussion of results and conclusion

Before discussing the broader implications of the results, a brief summary is warranted. It is found that, without including measures of autonomy and voice as regressors, job satisfaction has a statistically significant positive correlation with the wage level. But, when autonomy and voice are included in the satisfaction regression, the correlation between the wage and satisfaction decreases by roughly 50%, and becomes insignificant. Further, once autonomy and voice are included, the wage adds no explanatory power to the regression as evidenced by likelihood ratio tests.

Our results are consistent with similar empirical studies, including Bartling, Fehr, and Schmidt (2009), and complement Dube and Freeman (2008), where it is found that revenue-sharing payment schemes only improve worker productivity when workers also have influence over their workplace. The results are also consistent with Wood (2008) who also finds that autonomy and voice are important correlates of job satisfaction. However,

the idiosyncratic specification of the wage in Wood (2008) prevents an explicit comparison of the importance of pecuniary incentives and non-pecuniary job attributes.

When interpreting these results, however, it is important to note a couple of caveats. What we analyze is the experience of performing the work task itself conditional upon having a job, not what causes an individual to choose a particular type of work or job. Interpreted literally, these results suggest that increasing autonomy and/or voice within a workplace will increase the job satisfaction with the work itself. Whether this will help in recruiting new workers remains an open question, and highlights the importance of the decision/experience utility distinction (Kahneman et al. 1997; Kahneman 1999; Kahneman and Sugdon 2005).

Second, some caution is recommended regarding causality. This data set provides no way of assessing the importance of sorting across firms. It could be that workers who like the work itself are more likely to choose firms that provide them with autonomy and voice. Although this problem could be at play, for two reasons it is unlikely that it is driving the results. First, especially within a given occupation, almost all of economic theory would argue that the wage plays a critical role in determining which firm a worker chooses to work at. If sorting were strong, the coefficient on the wage should be much larger, unless workers are willing to give up income to avoid workplaces with autonomy and voice. Second, a portion of what determines both the wage a worker earns and how much autonomy and/or voice a worker has is the occupation, not the firm. The inclusion of occupation fixed effects would absorb this effect if it is present. However, the results remain essentially unchanged when occupation fixed effects are removed, further suggesting that sorting plays a little role in shaping the results.

Whatever the specific reason, our findings suggest that workplaces that give workers more autonomy and employee voice will have higher levels of satisfaction with the work itself. Although it is important to acknowledge the role that wages may play in recruiting workers and in overall well-being outside the workplace, theoretical models of employee search and matching that focus exclusively on wage characteristics and hold job characteristics constant will, on average, result in suboptimal work arrangements. And, to the extent that increases in autonomy and voice can be made with little to no cost to the firm, there is potential for firm policies to both increase motivation and make workers better off with long-lasting effect. An effect unlikely to be realized by wage increases alone.

Notes

1. For examples of seminal papers by economists on job satisfaction as an economic variable, See Hamermesh (1977) and Freeman (1978). Frey and Stutzer (2002) provides an excellent review of subjective evaluation studies for questions economists are traditionally study.
2. It is important to note that the distinction being drawn here between RCM and non-RCM models is different than the commonly drawn distinction between Neoclassical and Behavioral models. There are a number of Behavioral models that would still fall under the category of RCM as defined here. These include, most notably, some of the commonly used models of fairness (Akerlof 1982; Akerlof and Yellen 1990; Fehr and Schmidt 1999).
3. For example, see the edited volume by Freeman, Boxall, and Haynes (2007) for descriptive summaries of various attitudinal surveys that build upon survey work conducted in Freeman and Rogers (1999) and Freeman and Kleiner (2000). Studies based on data collected from the WPRS, BWRPS, AWRPS, NZWRPS, NCPP/ESRI/UCD, Canada-U.S. Labor Attitudes Survey, and WERS are presented.
4. Subjective evaluation surveys, while are not without noise that can arise from various factors (i.e. mood bias, response biases) offer the most widely used approach for studying satisfaction and are the method that we employ. Kahneman and Sugdon (2005) do discuss potential alternatives to measuring experience utility that have been used including the experience sampling methodology where each subject is asked to carry a device that beeps at random times during the day, at which time the subject is asked to respond to questions regarding her current

situation and affective state. They also describe the day reconstruction method where subjects are asked to think about their previous day, decompose it into short 'episodes' such as 'having dinner' or 'traveling to the gym' and then, for each episode, to note if she was interacting with anyone and to describe how her affective state (for example, 'happy', 'enjoying myself', 'frustrated/annoyed', 'worried/ anxious'). The day reconstruction method is thought to reduce the vulnerability of subjective measurements that might arise due to focusing illusions – or the tendency to exaggerate the importance of the current focus of one's attention because it does not prompt people to think about particular sources of happiness or unhappiness. Instead, respondents evaluate the overall affective experience of different episodes, whose boundaries they define for themselves.

5. The regressions were also run using two different job satisfaction indexes: the sum of the seven measures of job satisfaction and the first component of the principal components analysis. The results are qualitatively similar to the results using only satisfaction with work. The results can be found in a data appendix on the corresponding author's website.

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Appendix

Survey questions

Job satisfaction:

"How satisfied are you with the following aspects of your job ... The work itself?"

Voice:

"Overall, how good would you managers at this workplace are at ..."

- (1) "Seeking the views of employees or employee representatives?"
- (2) "Responding to suggestions from employees or employee representatives?"
- (3) "Allowing employees or employee representatives to influence final decisions?"

Autonomy:

"In general, how much influence do you have over the following?"

- (1) "What tasks you do in your job?"
- (2) "The place at which you work?"
- (3) "How you do your work?"
- (4) "The order in which you carry out tasks?"
- (5) "The time you start or finish your working day?"

Further results

Table A.1 reports the results of three ordered probit regressions. Column 1 replicates the full regression model in column 2 of Table 3. As is clear, the qualitative results are the same. However, the quantitative effect of the wage is slightly larger. Columns 2 and 3 of Table A.1 are validity checks of the variables representing voice and autonomy. Column 2 is an ordered probit regression for satisfaction with involvement. The positive association between satisfaction with involvement and autonomy and voice, respectively, suggests two things. First, the variables representing autonomy and voice do at least partially represent autonomy and voice. Second, autonomy and voice may be correlated with all aspects of job satisfaction.

Column 3 reports an ordered probit regression for satisfaction with initiative. Comparison of column 3 and column 2 demonstrates that autonomy and voice, respectively, do represent what it is claimed they represent. The coefficients on autonomy are larger for initiative than involvement, while the opposite is true for voice.

Table A.2 provides a further set of robustness checks. Column 1 replaces the dichotomous measures of voice and autonomy used in the main regressions in Table 3 with the categorical version reported in the data. As can be seen, the qualitative results are the same. All measures of autonomy and voice are statistically significantly positively associated with job satisfaction, while the wage is not.

The second column of Table A.2 estimates the same model as the full model in column 2 of Table 3, except the dependent variable is reversed. The dependent variable equals 1 if the job satisfaction is less than or equal to 2, and 0 otherwise. Also, the model is estimated using the dichotomous measures of autonomy and voice. All measures of autonomy and voice are statistically, significantly and negatively correlated with job satisfaction, while the wage is again insignificant. Thus, nothing unusual is happening by transforming the depending variable into a dichotomous measure. The results are the same whether ordered probit is used or the variable is coded in the opposite manner.

Finally, columns 3 and 4 of Table A.2 divide the sample by supervisor status. Since supervisors, almost by definition, have more autonomy and voice, but not all individuals within a given

occupation are supervisors, it could be that the results are driven by supervisors alone. Although some of the estimated coefficients are larger for supervisors, indicating that supervisors are more sensitive to the amount of voice and autonomy they have, the qualitative results hold. Most notably, the wage is statistically insignificant.

Table A.1. Ordered probit regressions for satisfaction with work itself, involvement and initiative.

<i>Variables</i>	<i>Work</i>	<i>Involvement</i>	<i>Initiative</i>
Wage	0.002 [0.002]		
<i>Voice</i>			
Solicit views	0.305*** [0.028]	0.586*** [0.026]	0.305*** [0.026]
Respond to suggestions	0.305*** [0.031]	0.570*** [0.028]	0.294*** [0.029]
Influence decisions	0.171*** [0.031]	0.718*** [0.029]	0.248*** [0.029]
<i>Autonomy</i>			
Order tasks	0.237*** [0.029]	0.296*** [0.026]	0.430*** [0.029]
Pace of work	0.101*** [0.028]	0.053** [0.026]	0.090*** [0.027]
How work done	0.234*** [0.027]	0.152*** [0.024]	0.363*** [0.025]
Order completed	0.136*** [0.026]	0.086*** [0.023]	0.270*** [0.027]
Start/stop time	0.105*** [0.025]	0.095*** [0.025]	0.168*** [0.026]
N	19,050	19,050	19,050
Pseudo R ²	0.099	0.201	0.138

Notes: Data are from the 2004 wave of the WERS. The dependent variable is ordered from 1 (the lowest satisfaction) to 5 (the highest satisfaction). Dependent variables are, respectively, satisfaction with work itself, satisfaction with involvement in decision-making and satisfaction with scope for initiative. Coefficients are marginal effects. Voice and autonomy variables are recoded to equal 1 if the related survey question equals 5, and 0 otherwise. Standard errors are clustered on the firm, and are reported in brackets. Other control variables include supervisor status, female, age, union status, tenure, education, hours, marital status, race/ethnicity, and three digit SOC 2000 occupation. Significance levels: *10%, **5% and ***1%.

Table A.2. Probit regression results for 'satisfaction with the work itself'.

<i>Variables</i>	<i>Continuous</i>	<i>Opp. Dep. Var.</i>	<i>Supervisors</i>	<i>Not supervisors</i>
Wage	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]	0.001 [0.001]
<i>Continuous voice</i>				
Solicit views	0.020*** [0.005]			
Respond to suggestions	0.029*** [0.006]			
Influence decisions	0.017*** [0.005]			
<i>Continuous autonomy</i>				
Tasks completed	0.030*** [0.005]			
Pace of work	0.007 [0.005]			
How work done	0.042*** [0.007]			
Order completed	0.014** [0.006]			
Start/stop time	0.013*** [0.003]			
<i>Voice</i>				
Solicit views		-0.042*** [0.006]	0.058*** [0.016]	0.043*** [0.009]
Respond to suggestions		-0.040*** [0.006]	0.063*** [0.018]	0.052*** [0.011]
Influence decisions		-0.018*** [0.007]	0.064*** [0.018]	0.030*** [0.010]
<i>Autonomy</i>				
Tasks completed		-0.019*** [0.005]	0.095*** [0.015]	0.038*** [0.010]
Pace of work		-0.011** [0.005]	0.039** [0.015]	0.014 [0.009]
How work done		-0.021*** [0.005]	0.065*** [0.014]	0.067*** [0.010]
Order completed		-0.017*** [0.005]	0.036*** [0.013]	0.024*** [0.009]
Start/stop time		-0.003 [0.005]	0.034** [0.014]	0.035*** [0.010]
N	16,927	18,996	6793	12,228
Pseudo R ²	0.159	0.129	0.16	0.154

Notes: Data are from the 2004 wave of the WERS. The dependent variable equals 1 if satisfaction with the work itself equals 5 in columns 1, 3 and 4. The dependent variable equals 1 if satisfaction with the work itself equals 1 or 2 in column 2. Coefficients are marginal effects. Voice and autonomy variables are recoded to equal 1 if related survey question equals 5, and 0 otherwise in columns 2, 3 and 4. Autonomy and voice range from 1 to 4 and 1 to 5, respectively, in column 1. Standard errors are clustered on the firm, and are reported in brackets. Other control variables include supervisor status, female, age, union status, tenure, education, hours, marital status, race/ethnicity and three-digit SOC 2000 occupation. Significance levels: *10%, **5% and ***1%.